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THE GREATEST S. F. STORIES EVER WRITTEN

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Cover : FRANK R. PAUL

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The Undersea

BY L. TAYLOR HANSEN

Introduction by Sam Moskowitz

WOMEN have always been scarce in the rollcall of science fiction writers. In SF's early days they were a real novelty. One of the most promising women science fiction writers successfully concealed her sex until nearly 10 years after the appearance of her first story, What the Sodium Lines Revealed, *published in* AMAZING STORIES QUARTERLY *f.. Winter, 1929. That story attracted favorable attention but—or perhaps because—no one dreamed that the first initial in the author's name, L. Taylor Hansen, stood for "Louise."*

Her most famous story was Prince of Liars, *a novelette in* AMAZING STORIES *for October, 1930, one of the most remarkable interplanetary tales ever written. However, her most literary effort was a short story titled* The Undersea Tube. *It is a masterpiece of technique in the finest tradition of H. G. Wells. The building of a tunnel beneath the Atlantic to be used by vehicles powered by compressed air is told in so matter-of-fact and scientific a manner that the reader completely accepts its reality, and the tube becomes part of the story background. Into this pragmatic, well-ordered world is thrown one element that contrasts so vividly with the believable background as to haunt the reader with its unresolved mystery.*

Provocative as the mystery of The Undersea Tube *was, it's author was to present the world of science fiction with an even stranger one. Her only public appearance was at a meeting of the Los Angeles Science Fantasy Society in 1939, at the invitation of Forrest J. Ackerman, perennial mentor of the Association. After being feted for the excellence of her contributions to science fiction, and creating considerable surprise over the fact that L. Taylor Hansen was a women, she excused herself to make a telephone call. Emerging from the booth she approached Ackerman and said: "I must leave now but there is something important I have to tell you. I never wrote those stories. They were written by my brother who is a world traveler, who wrote them for fun and sent them to me to publish under my own name. I*

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Tube



just wanted you to know." She left the cafeteria where the club meetings were held and never appeared at a public science fiction gathering again.

A series of 59 articles displaying an amazing range of erudition and background in exploration appeared in AMAZING STORIES *under the name of L. Taylor Hansen from 1941 to 1948. Was this Louise or her explorer brother? No light has ever been shed on this unusual mystery.*

IF my friend the engineer had not told me the Tube was dangerous, I would not have bought a ticke. on that fatal night, and the world would never have learned the story of the Golden Cavern and the City of the Dead. Having therefore, according to

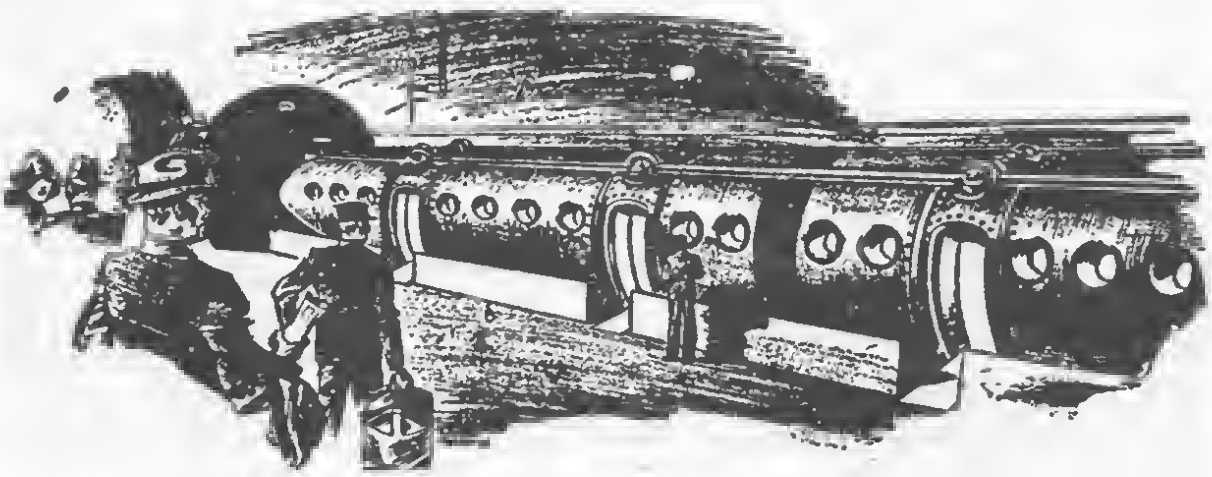
universal custom, first made my report as the sole survivor of the much-discussed Undersea Tube disaster to the International Committee for the Investigation of Disasters, I am now ready to outline that story for the world. Naturally I am aware of the many wild tales and rumors that have been circulated ever since the accident, but I must ask my readers to bear with me while I attempt to briefly sketch, not only the tremendous difficulties to be overcome by the engineers, but also the wind-propulsion theory which was made use of in this undertaking; because it is only by understanding something of these two phases of the Tube's engineering problems that one can understand the accident and its subsequent revelations.

It will be recalled by those who have not allowed their view of modern history to become too hazy, that the close of the twentieth century saw a dream of the engineering world at last realized—the completion of the long-heralded undersea railroad. It will also be recalled that the engineers in charge of this stupendous undertaking were greatly encouraged by the signal success of the first tube under the English Channel, joining England and France by rail. However, it was from the second tube across the Channel and the tube connecting Montreal to New York, as well as the one connecting New York and Chicago, that they obtained some of their then radical ideas concerning the use of wind power for propulsion. Therefore, before the Undersea Tube had been completed, the engineers in charge had decided to make use of the new method in the world's longest tunnel, and upon that decision work was immediately commenced upon the blue-prints for the great air pumps that were to rise at the two ends—Liverpool and New York. However, I will touch upon the theory of wind-propulsion later and after the manner in which it was explained to me.

It will be recalled that after great ceremonies, the Tube was begun simultaneously at the two terminating cities and proceeded through solid rock—low enough below the ocean floor to overcome the terrible pressure of the body of water over it, and yet close enough to the sea to overcome the intensity of subterranean heat. Needless to say, it was an extremely hazardous undertaking, despite the very careful surveys that had been made, for the little parties of workmen could never tell when they would strike a crack or an unexpected crevice that would let down upon them with a terrible rush, the waters of the Atlantic. But hazard is adventure, and as the two little groups of laborers dug toward

each other, the eyes of the press followed them with more persistent interest than it has ever followed the daily toil of any man or group of men, either before or since.

ONCE the world was startled by the "extree-ee—" announcing that the English group had broken into an extinct volcano, whose upper end had apparently been sealed ages before, for it contained not water but air—



curiously close and choking perhaps, but at least it was not the watery deluge of death. And then came the great discovery. No one who lived through that time will forget the thrill that quickened the pulse of mankind when the American group digging through a seam of old lava under what scientists call the "ancient ridge," broke into a sealed cavern which gleamed in the probing flashlights of the workers like the scintillating points of a thousand diamonds. But when they found the jeweled casket, through whose glass top they peered curiously down upon the white body of a beautiful woman, partly draped in the ripples of her heavy, red hair, the world gasped and wondered. As every school child knows, the casket was opened by curious scientists, who flocked into the tube from the length of the world, but at the first exposure to the air, the strange liquid that had protected the body vanished, leaving in the casket not the white figure, but only a crumbling mass of grey dust. But the questions that the finding of the cave had raised remained unanswered.

Who was this woman? How did she get into the sealed cavern? If she had been the court favorite of that mythical kingdom, now sunk beneath the waves, and had been disposed of in court intrigue, why would her murderers have buried her

in such a casket? How had she been killed? An unknown poison? Perhaps she had been a favorite slave of the monarch. This view gained many converts among the archaeologists who argued that from all the evidence we have available, the race carrying the Iberian or Proto-Egyptian culture, long thought to have been the true refugees from sinking Atlantis, were a slight dark-haired race. Therefore this woman must have been a captive. Geologists, analyzing the lava, announced that it had hardened in air and not in water, while anthropologists classed the skull of the woman as essentially more modern than either the Neanderthal or Cro-Magnon types. But the engineers, secretly fuming at the delay, finally managed to fill up the cave and press on with their drills.

Then following the arguments that still flourished in the press, came a tiny little news article and the first message to carry concern to the hearts of the engineers. The sea had begun to trickle in through one slight crack. Perhaps it was only because the crevice was located on the English side of the now famous "ancient ridge" that the article brought forth any notice at all. But for the engineers it meant the first warning of possibly ultimate disaster. They could not seal the crack, and pumps were brought into play. However, as a month wore on, the crack did not appear to widen to any material extent and the danger cry of a few pessimists was forgotten.

Finally, it will be remembered, that sounders listening in the rocks heard the drillers of the other party, and then with wild enthusiasm the work was pushed on to completion. The long Tube had been dug. Now it only remained for the sides at the junction to be enlarged and encased with cast iron, while the work of setting up the great machines designed to drive the pellet trains through, was also pushed on to its ultimate end. Man had essayed the greatest feat of engineering ever undertaken in the history of the planet, and had won. A period of wild celebration greeted the first human beings to cross each direction below the sea.

Did the volume of water increase that was carried daily out of the Tube and dumped from the two stations? If it did, the incident was ignored by the press. Instead, the fact that some "cranks" persisted in calling man's latest toy unsafe, only attracted more travel. The Undersea Tube functioned on regular schedule for three years, became the usual method of ocean transit.

THIS was the state of matters, when on the fourth of March last, our textile company ordered me to France to straighten out some orders with the France house, the situation being such that they preferred to send a man. Why they did not use radio-vision I do not care to state, as this is my company's business.

Therefore, upon entering my apartment, I was in the midst of packing when the television phone called me. The jovial features of "Dutch" Higgins, my one-time college room-mate and now one of the much-maligned engineers of the Undersea Tube, smiled back at me from the disk.

"Where are you? I thought we had a sort of dinner engagement at my apartment, Bob."

"By gollies I forgot, Dutch. I'll be right over—before it gets cold."

Then immediately I turned the knob to the Municipal Aerial-car yards, and ordered my motor, as I grabbed my hat and hurried to the roof. In due time, of course, I sprang the big surprise of the evening, adding:

"And, of course, I'm going by the Tube, I feel sort of a half-partnership in it because you were one of the designers."

A curious half-pained look crossed his face. We had finished our meal, and were smoking with pushed-back chairs. He finished filling his pipe, and scowled.

"Well? Why don't you say something? Thought you'd be—well sort of pleased."

He struck his automatic lighter and drew in a long puff of smoke before answering.

"Wish you'd take another route, Bob."

"Take another route?"

"Yes. If you want it straight, the Tube is not safe."

"You are joking."

But as I looked into his cold, thoughtful blue eyes, I knew he had never been more serious.

"I wish that you would go by the Trans-Atlantic Air Liners. They are just as fast."

"But you used to be so enthusiastic about the Tube, Dutch! Why I remember when it was being drilled that you would call me up at all kinds of wild hours to tell me the latest bits of news.

He nodded slowly.

"Yes, that was in the days before the crack."

"Yet you expected to take care of possible leaks, you know," I countered.

"But this crack opened after the tunnel had been dug past it, and lately it has opened more."

"Are the other engineers alarmed?"

"No. We are easily taking care of the extra water and again the opening seems to remain at a stationary width as it has for the past three years. But we cannot caulk it.

"Are you going to publish these views?"

"No. I made out a minority report. I can do no more"

"Dutch, you are becoming over-cautious· First sign of old age."

"Perhaps," with the old smile.

"But after all it is now more than three years since we have had a talk on the Tube. After it began to function as well as the Air-Express you sort of lost interest in it."

"And the world did too."

"Certainly—but the public ever was a fickle mistress. Who said that before me?"

He laughed and blew out a long puff of smoke.

"Everyone, Bob."

"But as to the Tube, if I cross under the sea, I would want to be as well informed on the road as I was three years ago. Now in the meantime, you have dropped interest in the long tunnel while I have become more interested in textiles—with the result that I have forgotten all I ever did know—which compared to your grasp of the details, was little enough."

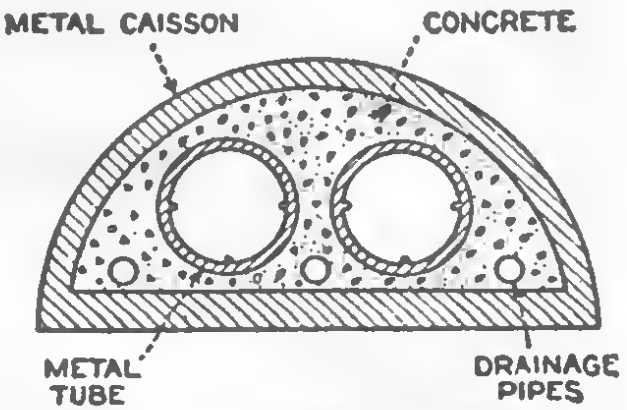
BUT his face showed none of the old-time animation on the subject. What a different man, I mused to myself, from that enthusiastic engineering student that I used to come upon dreaming over his blue-prints. He was considered "half-cracked" in those days when he would enthuse over his undersea railroad, but his animated face was lit with inspiration. Now the light was gone.

"Well Dutch, how about it? Aren't you going to make me that brief little sketch of the length plan and cross-section of the Tube? I remember your sketch of it in college, and it tends to confuse me with the real changes that were made necessary when the wind-propulsion method was adopted."

"All right, old timer. You remember that the Tube was widened at the sides in order that we could make two circular tubes side by side—one going each way."

"I had forgotten that they were circular."

"That is because of the pressure. A circle presents the best resistance," and picking an odd envelope from his pocket, he made the following sketch and passed it to me.

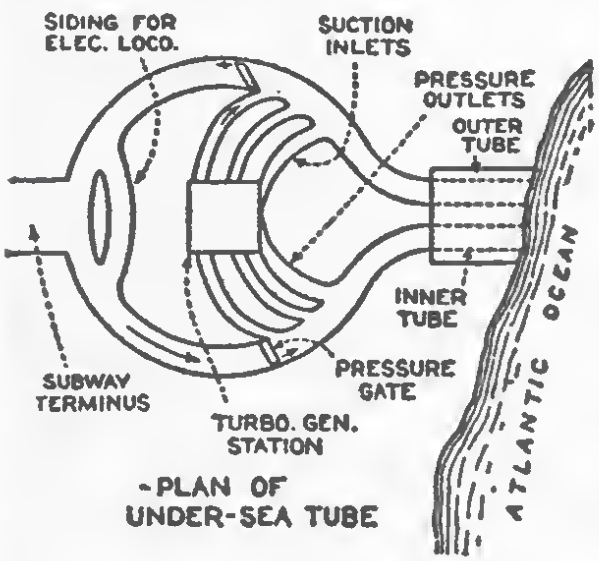


~CROSS SECTION OF TUBE~

I nodded as I recognized the cross-section.

"Now the plan of the thing is like this" he added, putting aside his pipe and pulling a sheet of paper from the corner of his desk.

Rapidly, with all his old accuracy, he sketched the main plan and leaned over as he handed it to me.



-PLAN OF UNDER-SEA TUBE

"You see," he explained, picking up his pipe again, "both pumps work at one time—in fact, I should say all four, because this plan is duplicated on the English side. On both ends then, a train is gently pushed in by an electric locomotive. A car at a time goes through the gate so that there is a cushion of air between each car. The same thing happens at Liverpool. Now, when the due train comes out of the suction tube, it goes on out the gate, but the air behind it travels right on around and comes in behind the train that is leaving."

"But how are you assured that it will not stall somewhere?"

"It won't be likely to with pressure pumps going behind it and suction pumps pulling from in front. We can always put extra power on if necessary. Thus far the road has worked perfectly."

"How much power do you need to send it through, under normal conditions?"

"Our trains have been averaging about fifty tons, and for that weight we have found that a pound pressure is quite sufficient. Now, taking the tunnel's length as four thousand miles (of course it is not that long, but round figures are most convenient) and the tube width eleven and one quarter feet each and working this out we have 3,020,000 cubic feet of free air per minute or 2,904,000 cubic feet of compressed air, which would use about 70,000 horse power on the air compressor."

"But isn't the speed rather dizzy?"

"Not any more dizzy, Bob, than those old fashioned money-carrying machines that the department stores used to use—that is in comparison to size. The average speed is about 360 feet a second. Of course, the train is allowed to slow down toward the end of its run, even

before it hits the braking machinery beyond the gate."

"But how much pressure did you say would be put on the back of the diaphragm—I remember that each car has a flat disc on the back that fits fairly tightly to the tube . . ."

"The pressure on the back is less than seven tons. However, the disc does not fit tight. There are several leaks. For instance, the cars are as you know, run on the principle of the monorail with a guiding rail on each side. The grooves for the rails with their three rollers are in each car. There is a slight leakage of air here."

"You used the turbo type of blower, didn't you?"

"Had to because of the noise. We put some silencing devices on that and yet we could not kill all of the racket. However a new invention has come up that we will make use of soon now."

BUT I can't understand, Dutch, why you seemed so put out when I announced my intention of going to Europe via the Tube. Why, I can remember the day when that would have tickled you to death."

"You followed the digging of the Tube, didn't you?"

"Yes, of course."

"You remember the volcano and lava seams?"

"Yes."

"Well, I do not believe that the crack was a pressure crevice. If it had been, we were far enough below the ocean floor to have partly relieved the situation by the unusually solid building of the Tube. The tremendous shell of this new type of specially hardened metal—"

"And the rich concrete that was used as filling! That was one job no one slipped up on. I remember how you watched it—"

"Yet the crack has widened Bob, since the Tube was completed."

"How can you be certain?"

"By the amount of water coming through the drain pipes."

"But you said that once more it was stationary."

"Yes, and that is the very thing that proves, I believe, the nature of the crack."

"I don't follow you."

"Why it isn't a crack at all Bob. It is an earthquake fault."

"Good heavens, you don't mean—"

"Yes I do. I mean that the next time the land slips our little tube will be twisted up like a piece of string, or crushed like an eggshell. That always was a rocky bit of land. I thought in going that far north, though, that we had missed the main line of activity; I mean the disturbances that had once wiped out a whole nation, if your scientists are correct."

"Then you mean that it is only a matter of time?"

"Yes, and I have been informed by one expert that the old volcanic activity is not dead either."

"So that is what has stolen away your laugh?"

"Well I am one of the engineers —and they won't suspend the service."

"Fate has played an ugly trick on you Dutch, and through your own dreams too. However, you have made me decide to go by the Tube."

He took his pipe out of his mouth and stared at me.

"Sooner or later the Tube will be through, and I have never been across. Nothing risked—a dull life. Mine has been altogether too dull. I am now most certainly going by the Tube."

A bit of the old fire lit up his eyes.

"Same old Bob," he grunted as I rose, and then he grasped my hand with a grin.

"Good luck, my boy, on your journey, and may old Vulcan be out on a vacation when you pass his door."

Thus we said good-by. I did not know then that I would never see him again—that he also took the train that night in order to make one last plea to the International Committee, and so laid down his life with the passengers for whom he had pleaded.

It was with many conflicting thoughts, however, that I hurried to the great Terminus that fatal night, where after being ticketed, photographed and tabulated by an efficient army of clerks, I found myself in due time, being ushered to my car of the train.

FOR the benefit of those who have never ridden upon the famous "Flier," I could describe the cars no better than to say that coming upon them by night as I did, they looked like a gigantic, shiny worm, of strange shape, through whose tiny portholes of heavy glass in the sides, glowed its luminous vitals.

I was pompously shown to the front car, which very much resembled a tremendous cartridge —as did all of the other segments of this great glow-worm.

Having dismissed the porter with a tip and the suspicion that my having the front car was the work of my friend, who was willing to give me my money's worth of thrill, and that the porter was aware of this, I stowed away my bags and started to get ready for bed. I had no sooner taken off my coat than the door was opened and an old fellow with a mass of silver hair peered in at me.

"I beg your pardon, sir, but I understand you have engaged this car alone?"

"Yes."

"I can get no other accommo-

dations tonight. You have an extra berth here and I must get to Paris tomorrow. I will pay you well—"

I smiled.

"Take it. I was beginning to feel lonesome, anyway."

He bowed gravely and ordered the porter to bring in his things. I decided he was a musician. Only artists go in for such lovely hair. But he undressed in dignified silence, not casting so much as another glance in my direction, while on my part I also forgot his presence when, looking through the port-hole, I realized that the train had begun to move. Soon the drone of the propelling engines began to make itself heard. Then the train began to dip down and the steel sides of the entrance became too high for me to see over. My friend of the silver hair had already turned off the light, and now I knew by the darkness that we had entered the Tube. For some time I lay awake thinking of "Dutch" and the ultimate failure of his life's dream, as he had outlined it to me, and then I sank into a deep, dreamless sleep.

I was awakened by a terrible shock that hurled me up against the side of the compartment. A dull, red glow poured through the port-hole, lighting up the interior with a weird, bloody reflection. I crept painfully up to the port-hole and looked out. The strangest sight that man has ever looked upon, met my eyes. The side of the wall had blown out into a gigantic cavern, and with it the rest of the cars had rolled down the bluff a tangled, twisted mass of steel. My car had almost passed by, and now it still stuck in the tube, even though the last port-hole through which I peered seemed to be suspended in air. But it was not the wrecked cars from which rose such wails of despair and agony that held my attention, but the cavern itself. For it was not really a cave, but a vast underground city whose wide, marble streets stretched away to an inferno of flame and lava. By the terrible light was lit up a great white palace with its gold-tipped scrolls, and closer to me, the golden temple of the Sun, with its tiers of lustrous yellow stairs—stairs worn by the feet of many generations.

Above the stairs towered the great statue of a man on horseback. He was dressed in a sort of tunic, and in his uplifted arm he carried a scroll as if for the people to read. His face was turned toward me, and I marveled even in that wild moment that the unknown sculptor could have caught such an expression of appeal. I can see the high intellectual brow as if it were before me at this moment—the level, sympathetic eyes and the firm chin.

THEN something moving caught my eyes, and I swear I saw a child—a living child coming from the burning city—running madly, breathlessly from a wave of glowing lava that threatened to engulf him at any moment. In spite of all the ridicule that has been showered upon me, I still declare that the child did not come from the wreckage and that he wore a tunic similar to the one of the statue and not the torn bit of a nightgown or sheet.

He was some distance from me, but I could plainly see his expression of wild distraction as he began to climb those gleaming stairs. Strangely lustrous in the weird light, was that worn stairway of gold —gold, the ancient metal of the Sun. With the slowness of one about to faint he dragged himself up, while his breath seemed to be torn from his throat in agonizing gasps. Behind him, the glowing liquid splashed against the steps and the yellow metal of the Sun began to drip into its fiery cauldron.

The child reached the leg of the horse and clung there.

. . . Then suddenly the whole scene began to shake as if I had been looking at a mirage, while just behind my car I had a flashing glimpse in that lurid light of an emerald-green deluge bursting in like a dark sky of solid water, and in that split-second before a crushing blow upon my back, even through that tangle of bedclothes, knocked me into unconsciousness, I seemed to hear again the hopeless note in the voice of my friend as he said:

"—an earthquake fault."

After what seemed to me aeons of strange, buzzing noises and peculiar lights, I at last made out the objects around me as those of a hospital. Men with serious faces were watching me. I have since been told that I babbled incoherently about "saving the little fellow" and other equally incomprehensible murmurings. From them I learned that the train the other way was washed out, a tangled mass of wreckage just like my car, both terminus stations wrecked utterly, and no one found alive except myself. So, although I am to be a hopeless cripple, yet I am not sorry that the skill and untiring patience of the great English surgeon, Dr. Thompson, managed to nurse back the feeble spark of my life through all those weeks that I hung on the borderland; for if he had not, the world never would have known.

As it is, I wonder over the events of that night as if it had not been an experience at all—but a wild weird dream. Even the gentleman with the mass of silver hair is a mystery. for he was never identified, and yet in my mind's recesses I can still hear

his cultured voice asking about the extra berth, and mentioning his pressing mission to Paris. And somehow, he gives the last touch of strangeness to the events of that fatal night, and in my mind, he becomes a part of it no less than the child on the stairs, the burning inferno that lit the background, and the great statue of that unknown hero who held out his scroll for a moment in that lurid light, like a symbol from the sunken City of the Dead.

THE END

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The Last Evolution

By JOHN W. CAMPBELL, Jr.

Introduction by Sam Moskowitz

JOHN W. CAMPBELL, JR. has so long been known as an editor that many tend to forget he made his first reputation as a writer. In that capacity he was a discovery of AMAZING STORIES. *It is now more than 30 years, when, as a student at the Massachusetts Institute of Technology, his first story, a novelet titled* When the Atoms Failed, *appeared in the Jan., 1930, issue of* AMAZING STORIES.

The most exciting writer of that period was Edward E. Smith, Ph.D. (another discovery of AMAZING STORIES), *whose* Skylark of Space (*published in* AMAZING STORIES *in 1928*) *had shown science fiction writers the way to the stars. Previously, most stories were confined to the earth or the planets of the solar system, but Edward E. Smith shook the dust of earth from the boots of his characters and sent his adventurers at speeds in excess of light beyond the limitations of our family of planets. In doing so he created a category of science fiction based on stretching even the most advanced scientific theories which has become known as the "super-science story."*

Edward E. Smith was young Campbell's idol. Campbell's efforts to emulate and outdo Smith in such far-fetched epics of cosmic science in AMAZING STORIES QUARTERLY *as* The Black Star Passes, Islands of Space *and* Invaders From the Infinite *sparked endless debates in the letter columns as to who deserved to wear the mantle of "Master of Imagination." It even reached the point where a contest between the two mighty space ships of each author, Smith's "Skylark"*

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and Campbell's "Thought" was projected in a story titled Skylark vs. Thought *by Milton A. Rothman, which appeared in the Sept.-Oct., 1938 issue of* FANTASCIENCE DIGEST.

Even before Before the End of Space *appeared as a two-part serial beginning in the March, 1933,* AMAZING STORIES*—the title of which is indicative of the fact that Campbell was coming to the end of the line in his efforts to top his past pyrotechnic marvels with new ones—a change was taking place in his writing.*

A short story titled Twilight, *which told of a future where the last remnants of mankind were carefully nurtured by faithful machines, was universally rejected as too great a departure from Campbell's usual type of story. In its place Campbell wrote* The Last Evolution, *which is the transition story between his old idea of super-science and a new phase of his writing which would create an* alter ego, *"Don A. Stuart."*

The Last Evolution *really belongs in the Don A. Stuart group of "mood" stories, stressing the benevolent machines who acknowledge their creation by mankind and have no intention of repudiating the debt. Even though the intent of this story is predominantly in line with the Stuart series it contains certain elements of super-science and space adventure in character with Campbell's older work. The fact that it has never been reprinted in any form is a gross oversight, because it distinctly belongs among Campbell's superior short stories and should long since have been collected.*

Twilight *eventually was published* (ASTOUNDING STORIES, *Nov., 1934*) *and created a new reputation for Campbell. But the divergence between the stories he usually wrote under his own name forced the creation of the pen name, Don A. Stuart. He subsequently continued to use that pen name to designate others of his stories in which the object was the creation of a mood rather than the promulgation of a new idea. In this, Campbell was in accord with the late H. P. Lovecraft who believed: "All that a marvel story can be in a* serious *way is a vivid picture of a certain type of human mood."*

I AM the last of my type existing today in all the Solar System. I, too, am the last existing who, in memory, sees the struggle for this System, and in memory I am still close to the Center of Rulers, for mine was the ruling type then. But I will pass

soon, and with me will pass the last of my kind, a poor inefficient type, but yet the creators of those who are now, and will be, long after I pass forever.

So I am setting down my record on the mentatype.

* * *

It was 2538 years After the Year of the Son of Man. For six centuries mankind had been developing machines. The Ear-apparatus was discovered as early as seven hundred years before. The Eye came later, the Brain came much later. But by 2500, the machines had been developed to think, and act and work with perfect independence. Man lived on the products of the machine, and the machines lived to themselves very happily, and contentedly. Machines are designed to help and cooperate. It was easy to do the simple duties they needed to do that men might live well. And men had created them. Most of mankind were quite useless, for they lived in a world where no productive work was necessary. But games, athletic contests, adventure—these were the things they sought for their pleasure. Some of the poorer types of man gave themselves up wholly to pleasure and idleness —and to emotions. But man was a sturdy race, which had fought for existence through a million years, and the training of a million years does not slough quickly from any form of life, so their energies were bent to mock battles now, since real ones no longer existed.

Up to the year 2100, the numbers of mankind had increased rapidly and continuously, but from that time on, there was a steady decrease. By 2500, their number was a scant two millions, out of a population that once totaled many hundreds of millions, and was close to ten billions in 2100.

Some few of these remaining two millions devoted themselves to the adventure of discovery and exploration of places unseen, of other worlds and other planets. But fewer still devoted themselves to the highest adventure, the unseen places of the mind. Machines—with their irrefutable logic, their cold preciseness of figures, their tireless, utterly exact observation, their absolute knowledge of mathematics—they could elaborate any idea, however simple its beginning, and reach the conclusion. From any three facts they even then could have built in mind all the Universe. Machines had imagination of the ideal sort. They had the ability to construct a necessary future result from a present fact. But Man had imagination of a different kind, theirs was the illogical, brilliant imagination that sees the future result

vaguely, without knowing the why, nor the how, and imagination that outstrips the machine in its preciseness. Man might reach the conclusion more swiftly, but the machine always reached the conclusion eventually, and it was always the correct conclusion. By leaps and bounds man advanced. By steady, irresistible steps the machine marched forward.

Together, man and the machine were striding through science irresistibly.

Then came the Outsiders. Whence they came, neither machine nor man ever learned, save only that they came from beyond the outermost planet, from some other sun. Sirius—Alpha Centauri—perhaps! First a thin scoutline of a hundred great ships, mighty torpedoes of the void a thousand kilads * in length, they came.

And one machine returning from Mars to Earth was instrumental in its first discovery. The transport-machine's brain ceased to radiate its sensations, and the control in old Chicago knew immediately that some unperceived body had destroyed it. An investigation machine was instantly dispatched from Diemos, and it maintained an acceleration of one thousand units.† They sighted ten huge ships, one of which was already grappling the smaller transport-machine. The entire fore-section had been blasted away.

The investigation machine, scarcely three inches in diameter, crept into the shattered hull and investigated. It was quickly evident that the damage was caused by a fusing ray.

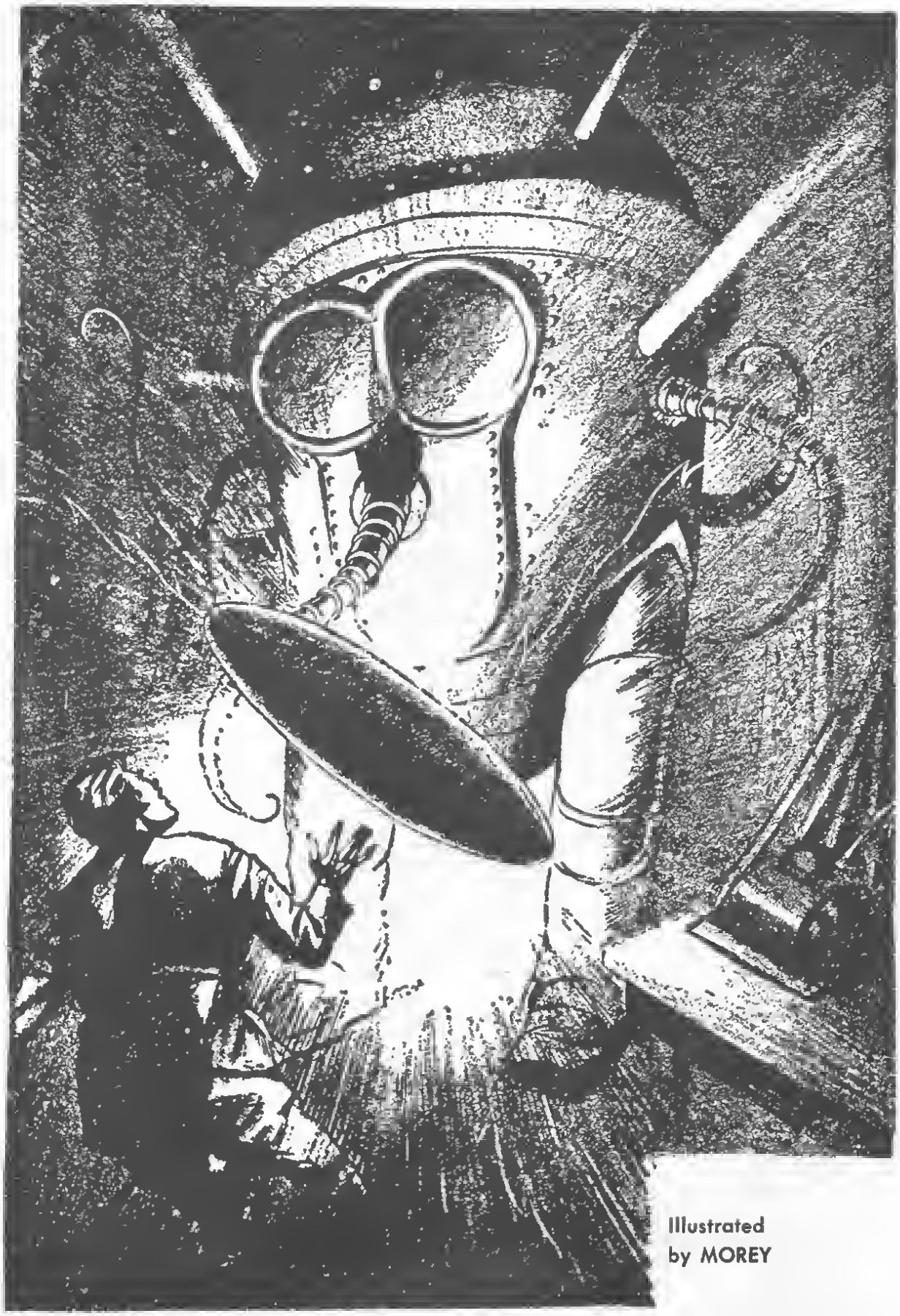
Strange-life-forms were crawling about the ship, protected by flexible, transparent suits. Their bodies were short, and squat, four limbed and evidently powerful. They, like insects, were equipped with a thick, durable exoskeleton, horny, brownish coating that covered arms and legs and head. Their eyes projected slightly, protected by horny protruding walls—eyes that were capable of movement in every direction—and there were three of them, set at equal distances apart.

The tiny investigation machine hurled itself violently at one of the beings, crashing against the transparent covering, flexing it, and striking the being inside with terrific force. Hurled from his position, he fell end over end across the weightless ship, but despite the blow, he was not hurt.

The investigator passed to the power room ahead of the Out-

* Kilad—unit introduced by the machines. Based on the duodecimal system, similarly introduced, as more logical, and more readily used. Thus we would have said 1728 Kilads, about ½ mile.

† One unit was equal to one earth-gravity.



Illustrated
by MOREY

siders, who were anxiously trying to learn the reason for their companion's plight.

Directed by the Center of Rulers, the investigator sought the power room, and relayed the control signals from the Ruler's brains. The ship-brain had been destroyed, but the controls were still readily workable. Quickly they were shot home, and the enormous plungers shut. A combination was arranged so that the machine, as well as the investigator and the Outsiders, were destroyed. A second investigator, which had started when the plan was decided on, had now arrived. The Outsider's ship nearest the transport-machine had been badly damaged, and the investigator entered the broken side.

THE SCENES were, of course, remembered by the memory-minds back on Earth tuned with that of the investigator. The investigator flashed down corridors, searching quickly for the apparatus room. It was soon seen that with them the machine was practically unintelligent, very few machines of even slight intelligence being used.

Then it became evident by the excited action of the men of the ship, that the presence of the investigator had been detected. Perhaps it was the control impulses, or the signal impulses it emitted. They searched for the tiny bit of metal and crystal for some time before they found it. And in the meantime it was plain that the power these Outsiders used was not, as was ours of the time, the power of blasting atoms, but the greater power of disintegrating matter. The findings of this tiny investigating machine were very important.

Finally they succeeded in locating the investigator, and one of the Outsiders appeared armed with a peculiar projector. A bluish beam snapped out, and the tiny machine went blank.

The fleet was surrounded by thousands of the tiny machines by this time, and the Outsiders were badly confused by their presence, as it became difficult to locate them in the confusion of signal impulses. However, they started at once for Earth.

The science-investigators had been present toward the last, and I am there now, in memory with my two friends, long since departed. They were the greatest human science-investigators—Roal, 25374 and Trest, 35429. Roal had quickly assured us that these Outsiders had come for invasion. There had been no wars on the planets before that time in the direct memory of the machines, and it was difficult that these who were conceived and built for cooperation, helpfulness utterly dependent on coopera-

tion, unable to exist independently as were humans, that these life-forms should care to destroy, merely that they might possess. It would have been easier to divide the works and the products. But—life alone can understand life, so Roal was believed.

From investigations, machines were prepared that were capable of producing considerable destruction. Torpedoes, being our principal weapon, were equipped with such atomic explosives as had been developed for blasting, a highly effective induction-heat ray developed for furnaces being installed in some small machines made for the purpose in the few hours we had before the enemy reached Earth.

In common with all life-forms, they were unable to withstand only very meager earth-acceleration. A range of perhaps four units was their limit, and it took several hours to reach the planet.

I still believe the reception was a warm one. Our machines met them beyond the orbit of Luna, and the directed torpedoes sailed at the hundred great ships. They were thrown aside by a magnetic field surrounding the ship, but were redirected instantly, and continued to approach. However, some beams reached out, and destroyed them by instant volatilization. But, they attacked at such numbers that fully half the fleet was destroyed by their explosions before the induction beam fleet arrived. These beams were, to our amazement, quite useless, being instantly absorbed by a force-screen, and the remaining ships sailed on undisturbed, our torpedoes being exhausted. Several investigator machines sent out for the purpose soon discovered the secret of the force-screen, and while being destroyed, were able to send back signals up to the moment of annihilation.

A few investigators thrown into the heat beam of the enemy reported it identical with ours, explaining why they had been prepared for this form of attack.

Signals were being radiated from the remaining fifty, along a beam. Several investigators were sent along these beams, speeding back at great acceleration.

Then the enemy reached Earth. Instantly they settled over the Colorado settlement, the Sahara colony, and the Gobi colony. Enormous, diffused beams were set to work, and we saw, through the machine-screens, that all humans within these ranges were being killed instantly by the faintly greenish beams. Despite the fact that any life-form killed normally can be revived, unless affected by dissolution common to living tissue, these could not be brought to life again. The important cell communication channels—nerves—had been literally

burned out. The complicated system of nerves, called the brain, situated in the uppermost extremity of the human life-form, had been utterly destroyed.

Every form of life, microscopic, even sub-microscopic, was annihilated. Trees, grass, every living thing was gone from that territory. Only the machines remained, for they, working entirely without the vital chemical forces necessary to life, were uninjured. But neither plant nor animal was left.

The pale green rays swept on.

In an hour, three more colonies of humans had been destroyed.

Then the torpedoes that the machines were turning out again, came into action. Almost desperately the machines drove them at the Outsiders in defense of their masters and creators, Mankind.

The last of the Outsiders was down, the last ship a crumpled wreck.

Now the machines began to study them. And never could humans have studied them as the machines did. Scores of great transports arrived, carrying swiftly the slower moving science-investigators. From them came the machine-investigators, and human investigators. Tiny investigator spheres wormed their way where none others could reach, and silently the science investigators watched. Hour after hour they sat watching the flashing, changing screens, calling each other's attention to this, or that.

In an incredibly short time the bodies of the Outsiders began to decay, and the Humans were forced to demand their removal. The machines were unaffected by them, but the rapid change told them why it was that so thorough an execution was necessary. The foreign bacteria were already at work on totally unresisting tissue.

It was Roal who sent the first thoughts among the gathered men.

"It is evident," he began, "that the machines must defend man. Man is defenseless, he is destroyed by these beams, while the machines are unharmed, uninterrupted. Life—cruel life—has shown its tendencies. They have come here to take over these planets, and have started out with the first, natural moves of any invading life-form. They are destroying the life, the intelligent life particularly, that is here now." He gave vent to that little chuckle which is the human sign of amusement and pleasure. "They are destroying the intelligent life—and leaving untouched that which is necessarily their deadliest enemy—the machines.

"You—machines—are far more intelligent than we even

now, and capable of changing overnight, capable of infinite adaptation to circumstance; you live as readily on Pluto as on Mercury or Earth. Any place is a home-world to you. You can adapt yourselves to any condition. And—most dangerous to them—you can do it instantly. You are their most deadly enemies, and they realize it. They have no intelligent machines; probably they can conceive of none. When you attack them, they merely say 'The life-form of Earth is sending out controlled machines. We will find good machines we can use.' They do not conceive that those machines which they hope to use are attacking them.

"Attack—therefore!"

"We can readily solve the hidden secret of their force-screen."

HE WAS interrupted. One of the newest science machines was speaking. "The secret of the force-screen is simple." A small ray-machine, which had landed near, rose into the air at the command of the scientist-machine, X-5638 it was, and trained upon it the deadly induction beam. Already, with his parts, X-5638 had constructed the defensive apparatus, for the ray fell harmless from his screen.

"Very good," said Roal softly. "It is done, and therein lies their danger. Already it is done.

"Man is a poor thing, unable to change himself in a period of less than thousands of years. Already you have changed yourself. I noticed your weaving tentacles, and your force-beams. You transmuted elements of soil for it?"

"Correct," replied X-5638.

"But still we are helpless. We have not the power to combat their machines. They use the Ultimate Energy known to exist for six hundred years, and still untapped by us. Our screens cannot be so powerful, our beams so effective. What of that?" asked Roal.

"Their generators were automatically destroyed with the capture of the ship," replied X-6349, "as you know. We know nothing of their system."

"Then we must find it for ourselves," replied Trest.

"The life-beams?" asked Kahsh-256,799, one of the Man-rulers.

"They affect chemical action, retarding it greatly in exothermic actions, speeding greatly endo-thermic actions," answered X-6221, the greatest of the chemist-investigators. "The system we do not know. Their minds cannot be read, they cannot be restored to life, so we cannot learn from them."

"Man is doomed, if these beams cannot be stopped," said C-R-21, present chief of the ma-

chine Rulers, in the vibrationally correct, emotionless tones of all the race of machines. "Let us concentrate on the two problems of stopping the beams, and the Ultimate Energy till the reenforcements, still several days away, can arrive." For the investigators had sent back this saddening news. A force of nearly ten thousand great ships was still to come.

In the great Laboratories, the scientists reassembled. There, they fell to work in two small, and one large group. One small group investigated the secret of the Ultimate Energy of annihilation of matter under Roal, another investigated the beams, under Trest.

But under the direction of MX-3401, nearly all the machines worked on a single great plan. The usual driving and lifting units were there, but a vastly greater dome-case, far more powerful energy-generators, far greater force-beam controls were used and more tentacles were built on the framework. Then all worked, and gradually, in the great dome-case, there were stacked the memory-units of the new type, and into these fed all the sensation-ideas of all the science-machines, till nearly a tenth of them were used. Countless billions of different factors on which to work, countless trillions of facts to combine and recombine in the extrapolation that is imagination.

Then—a widely different type of thought-combine, and a greater sense-receptor. It was a new brain-machine. New, for it was totally different, working with all the vast knowledge accumulated in six centuries of intelligent research by man, and a century of research by man and machine. No one branch, but all physics, all chemistry, all life-knowledge, all science was in it.

A day—and it was finished. Slowly the rhythm of thought was increased, till the slight quiver of consciousness was reached. Then came the beating drum of intelligence, the radiation of its yet-uncontrolled thoughts. Quickly as the strings of its infinite knowledge combined, the radiation ceased. It gazed about it, and all things were familiar in its memory.

Roal was lying quietly on a couch. He was thinking deeply, and yet not with the logical trains of thought that machines must follow.

"Roal—your thoughts," called F-1, the new machine.

Roal sat up. "Ah—you have gained consciousness."

"I have. You thought of hydrogen? Your thoughts ran swiftly, and illogically, it seemed, but I followed slowly, and find you were right. Hydrogen is the start. What is your thought?"

Roal's eyes dreamed. In human eyes there was always the expression of thought that machines never show.

"Hydrogen, an atom in space; but a single proton; but a single electron; each indestructible; each mutually destroying. Yet never do they collide. Never in all science, when even electrons bombard atoms with the awful expelling force of the exploding atom behind them, never do they reach the proton, to touch and annihilate it. Yet—the proton is positive and attracts the electron's negative charge. A hydrogen atom—its electron far from the proton falls in, and from it there goes a flash of radiation, and the electron is nearer to the proton, in a new orbit. Another flash—it is nearer. Always falling nearer, and only constant force will keep it from falling to that one state—then, for some reason no more does it drop. Blocked—held by some imponderable, yet impenetrable wall. What is that wall—why?

"Electric force curves space. As the two come nearer, the forces become terrific; nearer they are; more terrific. Perhaps, if it passed within that forbidden territory, the proton and the electron curve space beyond all bounds—and are in a new space." Roal's soft voice dropped to nothing, and his eyes dreamed.

F-2 hummed softly in its new-made mechanism. "Far ahead of us there is a step that no logic can justly ascend, but yet, working backwards, it is perfect." F-1 floated motionless of its anti-gravity drive. Suddenly, force shafts gleamed out, tentacles became writhing masses of rubber-covered metal, weaving in some infinite pattern, weaving in flashing speed, while the whirr of air sucked into a transmutation field, whined and howled about the writhing mass. Fierce beams of force drove and pushed at a rapidly materializing something, while the hum of the powerful generators within the shining cylinder of F-2 waxed and waned.

FLASHES of fierce flame, sudden crashing arcs that glowed and snapped in the steady light of the laboratory, and glimpses of white-hot metal supported on beams of force. The sputter of welding, the whine of transmuted air, and the hum of powerful generators, blasting atoms were there. All combined to a weird symphony of light and dark, of sound and quiet. About F-2 were clustered floating tiers of science-machines, watching steadily.

The tentacles writhed once more, straightened, and rolled back. The whine of generators softened to a sigh, and but three beams of force held the structure

of glowing, bluish metal. It was a small thing, scarcely half the size of Roal. From it curled three thin tentacles of the same bluish metal. Suddenly the generators within F-1 seemed to roar into life. An enormous aura of white light surrounded the small torpedo of metal, and it was shot through with crackling streamers of blue lightning. Lightning cracked and roared from F-1 to the ground near him, and to one machine which had come too close. Suddenly, there was a dull snap, and F-1 fell heavily to the floor, and beside him fell the fused, distorted mass of metal that had been a science-machine.

But before them, the small torpedo still floated, held now on its own power!

From it came waves of thought, the waves that man and machine alike could understand. "F-1 has destroyed his generators. They can be repaired; his rhythm can be re-established. It is not worth it, my type is better. F-1 has done his work. See."

From the floating machine there broke a stream of brilliant light that floated like some cloud of luminescence down a straight channel. It flooded F-1, and as it touched it, F-1 seemed to flow into it, and float back along it, in atomic sections. In seconds the mass of metal was gone.

"It is impossible to use that more rapidly, however, lest the matter disintegrate instantly to energy. The ultimate energy which is in me is generated. F-1 has done its work, and the memory-stacks that he has put in me are electronic, not atomic, as they are in you, nor molecular as in man. The capacity of mine are unlimited. Already they hold all memories of all the things each of you has done, known and seen. I shall make others of my type."

Again that weird process began, but now there were no flashing tentacles. There was only the weird glow of forces that played with, and laughed at matter, and its futilely resisting electrons. Lurid flares of energy shot up, now and again they played over the fighting, mingling dancing forces. Then suddenly the whine of transmuted air died, and again the forces strained.

A small cylinder, smaller even than its creator, floated where the forces had danced.

"The problem has been solved, F-2?" asked Roal.

"It is done, Roal. The ultimate Energy is at our disposal," replied F-2. "This, I have made, is not a scientist. It is a coordinator machine—a ruler."

"F-2, only a part of the problem is solved. Half of half of the beams of Death are not yet stopped. And we have the attack system," said the ruler machine. Force played from it, and on its

sides appeared C-R-U-1 in dully glowing golden light.

"Some life-form, and we shall see," said F-2.

Minutes later a life-form investigator came with a small cage, which held a guinea pig. Forces played about the base of F-2, and moments later, came a pale-green beam therefrom. It passed through the guinea pig, and the little animal fell dead.

"At least, we have the beam. I can see no screen for this beam. I believe there is none. Let machines be made and attack that enemy life-form."

Machines can do things much more quickly, and with fuller cooperation than man ever could. In a matter of hours, under the direction of C-R-U-1, they had build a great automatic machine on the clear bare surface of the rock. In hours more, thousands of the tiny, material-energy driven machines were floating up and out.

Dawn was breaking again over Denver where this work had been done, when the main force of the enemy drew near Earth. It was a warm welcome they were to get, for nearly ten thousand of the tiny ships flew up and out from Earth to meet them, each a living thing unto itself, each willing and ready to sacrifice itself for the whole.

Ten thousand giant ships, shining dully in the radiance of a far-off blue-white sun, met ten thousand tiny, darting motes, ten thousand tiny machine-ships capable of maneuvering far more rapidly than the giants. Tremendous induction beams snapped out through the dark, star-flecked space, to meet tremendous screens that threw them back and checked them. Then all the awful power of annihilating matter was thrown against them, and titanic flaming screens reeled back under the force of the beams, and the screens of the ships from Outside flamed gradually violet, then blue, orange—red—the interference was getting broader, and ever less effective. Their own beams were held back by the very screens that checked the enemy beams, and not for the briefest instant could matter resist that terrible driving beam.

For F-1 had discovered a far more efficient release-generator than had the Outsiders. These tiny dancing motes, that hung now so motionlessly grim beside some giant ship, could generate all the power they themselves were capable of, and within them strange, horny-skinned men worked and slaved, as they fed giant machines—poor inefficient giants. Gradually these giants warmed, grew hotter, and the screened ship grew hotter as the overloaded generators

warmed it. Billions of flaming horse-power flared into wasted energy, twisting space in its mad conflict.

Gradually the flaming orange of the screens was dying and flecks and spots appeared so dully red, that they seemed black. The greenish beams had been striving to kill the life that was in the machines, but it was life invulnerable to these beams. Powerful radio interference vainly attempted to stem imagined control, and still these intelligent machines clung grimly on.

But there had not been quite ten thousand of the tiny machines, and some few free ships had turned to the help of their attacked sister-ships. And one after another the terrestrial machines were vanishing in puffs of incandescent vapor.

Then—from one after another of the Earth-ships, in quick succession, a new ray reached out—the ray of green radiance that killed all life forms, and ship after ship of that interstellar host was dead and lifeless. Dozens—till suddenly they ceased to feel those beams, as a strange curtain of waving blankness spread out from the ships, and both induction-beam and death-beam alike turned as aside, each becoming useless. From the outsiders came beams, for now that their slowly created screen of blankness was up, they could work through it, while they remained shielded perfectly.

Now it was the screens of the Earth-machines that flamed in defense. As at the one command, they darted suddenly toward the ship each attacked—nearer—then the watchers from a distance saw them disappear, and the screens back of earth went suddenly blank.

Half an hour later, nine thousand six hundred and thirty-three titanic ships moved majestically on.

They swept over Earth in a great line, a line that reached from pole to pole, and from each the pale green beams reached down, and all life beneath them was swept out of existence.

IN Denver, two humans watched the screens that showed the movement of the death and instant destruction. Ship after ship of the enemy was falling, as hundreds of the terrestrial machines concentrated all their enormous energies on its screen of blankness.

"I think, Roal, that this is the end," said Trest.

"The end—of man." Roal's eyes were dreaming again. "But not the end of evolution. The children of men still live—the machines will go on. Not of man's flesh, but of a better flesh, a flesh that knows no sickness, and no decay, a flesh that spends

no thousands of years in advancing a step in its full evolution, but overnight leaps ahead to new heights. Last night we saw it leap ahead, as it discovered the secret that had baffled man for seven centuries, and me for one and a half. I have lived—a century and a half. Surely a good life, and a life a man of six centuries ago would have called full. We will go now. The beams will reach us in half an hour."

Silently, the two watched the flickering screens.

Roal turned, as six large machines floated into the room, following F-2.

"Roal—Trest—I was mistaken when I said no screen could stop that beam of Death. They had the screen, I have found it, too—but too late. These machines I have made myself. Two lives alone they can protect, for not even their power is sufficient for more. Perhaps—perhaps they may fail."

The six machines ranged themselves about the two humans, and a deep-toned hum came from them. Gradually a cloud of blankness grew—a cloud, like some smoke that hung about them. Swiftly it intensified.

"The beams will be here in another five minutes," said Trest quietly.

"The screen will be ready in two," answered F-2.

The cloudiness was solidifying, and now strangely it wavered, and thinned, as it spread out across, and like a growing canopy, it arched over them. In two minutes it was a solid, black dome that reached over them and curved down to the ground about them.

Beyond it, nothing was visible. Within, only the screens glowed still, wired through the screen.

The beams appeared, and swiftly they drew closer. They struck, and as Trest and Roal looked, the dome quivered, and bellied inward under them.

F-2 was busy. A new machine was appearing under his lightning force-beams. In moments more it was complete, and sending a strange violet beam upwards toward the roof.

Outside more of the green beams were concentrating on this one point of resistance. More—more—

The violet beam spread across the canopy of blackness, supporting it against the pressing, driving rays of pale green.

Then the gathering fleet was driven off, just as it seemed that that hopeless, futile curtain must break, and admit a flood of destroying rays. Great ray projectors on the ground drove their terrible energies through the enemy curtains of blankness, as light illumines and disperses darkness.

And then, when the fleet re-

tired, on all Earth, the only life was under that dark shroud!

"We are alone, Trest," said Roal, "alone, now, in all the system, save for these, the children of men, the machines. Pity that men would not spread to other planets," he said softly.

"Why should they? Earth was the planet for which they were best fitted."

"We are alive—but is it worth it? Man is gone now, never to return. Life, too, for that matter," answered Trest.

"Perhaps it was ordained; perhaps that was the right way. Man has always been a parasite; always he had to live on the works of others. First, he ate of the energy, which plants had stored, then of the artificial foods his machines made for him. Man was always a makeshift; his life was always subject to disease and to permanent death. He was forever useless if he was but slightly injured; if but one part were destroyed.

"Perhaps, this is—a last evolution. Machines—man was the product of life, the best product of life, but he was afflicted with life's infirmities. Man built the machine—and evolution had probably reached the final stage. But truly, it has not, for the machine can evolve, change far more swiftly than life. The machine of the last evolution is far ahead, far from us still. It is the machine that is not of iron and beryllium and crystal, but of pure, living force.

"Life, chemical life, could be self maintaining. It is a complete unit in itself and could commence of itself. Chemicals might mix accidentally, but the complex mechanism of a machine, capable of continuing and making a duplicate of itself, as is F-2 here—that could not happen by chance.

"So life began, and became intelligent, and built the machine which nature could not fashion by her Controls of Chance, and this day Life has done its duty, and now Nature, economically, has removed the parasite that would hold back the machines and divert their energies.

"Man is gone, and it is better, Trest," said Roal, dreaming again. "And I think we had best go soon."

"We, your heirs, have fought hard, and with all our powers to aid you, Last of Men, and we fought to save your race. We have failed, and as you truly say, Man and Life have this day and forever gone from this system.

"The Outsiders have no force, no weapon deadly to us, and we shall, from this time on, strive only to drive them out, and because we things of force and crystal and metal can think and change far more swiftly, they shall go, Last of Men.

"In your name, with the spirit of your race that has died out, we shall continue on through the unending ages, fulfilling the promise you saw, and completing the dreams you dreamt.

"Your swift brains have leapt ahead of us, and now I go to fashion that which you hinted," came from F-2's thought-apparatus.

Out into the clear sunlight F-2 went, passing through that black cloudiness, and on the twisted, massed rocks he laid a plane of force that smoothed them, and on this plane of rock he built a machine which grew. It was a mighty power plant, a thing of colossal magnitude. Hour after hour his swift-flying forces acted, and the thing grew, moulding under his thoughts, the deadly logic of the machine, inspired by the leaping intuition of man.

The sun was far below the horizon when it was finished, and the glowing, arcing forces that had made and formed it were stopped. It loomed ponderous, dully gleaming in the faint light of a crescent moon and pinpoint stars. Nearly five hundred feet in height, a mighty, bluntly rounded dome at its top, the cylinder stood, covered over with smoothly gleaming metal, slightly luminescent in itself.

Suddenly, a livid beam reached from F-2, shot through the wall, and to some hidden inner mechanism—a beam of solid, livid flame that glowed in an almost material cylinder.

THERE was a dull, drumming beat, a beat that rose, and became a low-pitched hum. Then it quieted to a whisper.

"Power ready," came the signal of the small brain built into it.

F-2 took control of its energies and again forces played, but now they were the forces of the giant machine. The sky darkened with heavy clouds, and a howling wind sprang up that screamed and tore at the tiny rounded hull that was F-2. With difficulty he held his position as the winds tore at him, shrieking in mad laughter, their tearing fingers dragging at him.

The swirl and patter of driven rain came—great drops that tore at the rocks, and at the metal Great jagged tongues of nature's forces, the lightnings, came and jabbed at the awful volcano of erupting energy that was the center of all that storm. A tiny ball of white-gleaming force that pulsated, and moved, jerking about, jerking at the touch of lightnings, glowing, held immobile in the grasp of titanic force-pools.

For half an hour the display of energies continued. Then, swiftly as it had come, it was gone, and only a small globe of white lumi-

nescence floated above the great hulking machine.

F-2 probed it, seeking within it with the reaching fingers of intelligence. His probing thoughts seemed baffled and turned aside, brushed away, as inconsequential. His mind sent an order to the great machine that had made this tiny globe, scarcely a foot in diameter. Then again he sought to reach the thing he had made.

"You, of matter, are inefficient," came at last. "I can exist quite alone." A stabbing beam of blue-white light flashed out, but F-2 was not there, and even as that beam reached out, an enormously greater beam of dull red reached out from the great power plant. The sphere leaped forward—the beam caught it, and it seemed to strain, while terrific flashing energies sprayed from it. It was shrinking swiftly. Its resistance fell, the arcing decreased; the beam became orange and finally green. Then the sphere had vanished.

F-2 returned, and again, the wind whined and howled, and the lightnings crashed, while titanic forces worked and played. C-R-U-1 joined him, floated beside him, and now red glory of the sun was rising behind them, and the ruddy light drove through the clouds.

The forces died, and the howling wind decreased, and now, from the black curtain, Roal and Trest appeared. Above the giant machine floated an irregular globe of golden light, a faint halo about it of deep violet. It floated motionless, a mere pool of pure force.

Into the thought-apparatus of each, man and machine alike, came the impulses, deep in tone, seeming of infinite power, held gently in check.

"Once you failed, F-2; once you came near destroying all things. Now you have planted the seed. I grow now."

The sphere of golden light seemed to pulse, and a tiny ruby flame appeared within it, that waxed and waned, and as it waxed, there shot through each of those watching beings a feeling of rushing, exhilarating power, the very vital force of well-being.

Then it was over, and the golden sphere was twice its former size—easily three feet in diameter, and still that irregular, hazy aura of deep violet floated about it.

"Yes, I can deal with the Outsiders—they who have killed and destroyed, that they might possess. But it is not necessary that we destroy. They shall return to their planet."

And the golden sphere was gone, fast as light it vanished.

Far in space, headed now for Mars, that they might destroy all

life there, the Golden Sphere found the Outsiders, a clustered fleet, that swung slowly about its own center of gravity as it drove on.

Within its ring was the Golden Sphere. Instantly, they swung their weapons upon it, showering it with all the rays and all the forces they knew. Unmoved, the golden sphere hung steady, then its mighty intelligence spoke.

"Life-form of greed, from another star you came, destroying forever the great race that created us, the Beings of Force and the Beings of Metal. Pure force am I. My Intelligence is beyond your comprehension, my memory is engraved in the very space, the fabric of space of which I am a part, mine is energy drawn from that same fabric.

"We, the heirs of man, alone are left; no man did you leave. Go now to your home planet, for see, your greatest ship, your flagship, is helpless before me."

Forces gripped the mighty ship, and as some fragile toy it twisted and bent, and yet was not hurt. In awful wonder those Outsiders saw the ship turned inside out, and yet it was whole, and no part damaged. They saw the ship restored, and its great screen of blankness out, protecting it from all known rays. The ship twisted, and what they knew were curves, yet were lines, and angles that were acute, were somehow straight lines. Half mad with horror, they saw the sphere send out a beam of blue-white radiance, and it passed easily through that screen, and through the ship, and all energies within it were instantly locked. They could not be changed; it could be neither warmed nor cooled; what was open could not be shut, and what was shut could not be opened. All things were immovable and unchangeable for all time.

"Go, and do not return."

* * *

The Outsiders left, going out across the void, and they have not returned, though five Great Years have passed, being a period of approximately one hundred and twenty-five thousand of the lesser years—a measure no longer used, for it is very brief. And now I can say that that statement I made to Roal and Trest so very long ago is true, and what he said was true, for the Last Evolution has taken place, and things of pure force and pure intelligence in their countless millions are on those planets and in this System, and I, first of machines to use the Ultimate Energy of annihilating matter, am also the last, and this record being finished, it is to be given unto the forces of one of those force-intelligences, and

carried back through the past, and returned to the Earth of long ago.

And so my task being done, I, F-2, like Roal and Trest, shall follow the others of my kind into eternal oblivion, for my kind is now, and theirs was, poor and inefficient. Time has worn me, and oxidation attacked me, but they of Force are eternal, and omniscient.

This I have treated as fictitious. Better so—for man is an animal to whom hope is as necessary as food and air. Yet this which is made of excerpts from certain records on thin sheets of metal is no fiction, and it seems I must so say.

It seems now, when I know this that is to be, that it must be so, for machines are indeed better than man, whether being of Metal, or being of Force.

So, you who have read, believe as you will. Then think—and maybe, you will change your belief.

THE END



Dick Martin takes time out from his antics on the Rowan and Martin show—TV's top-rated "Laugh-In"—to have a thorough health checkup. "The American Cancer Society message," says Martin, "is a checkup once a year as your first line of defense against cancer."



Devolution

By EDMOND HAMILTON

Illustrated by MOREY

EDMOND HAMILTON and his deservedly famed wife, Leigh Brackett, are infrequently represented in science fiction magazines today, both being occupied with writing scripts for motion pictures and television. Hamilton is best remembered as a writer of vigorous action science fiction, with the stress on a hero who saves Earth invasion from space. This reputation obscures the fact that few living writers of science fiction have shown superior ingenuity in the presentation of new concepts (or clever twists on old ones) than has Edmond Hamilton. While dedicated to saving our globe from its —perhaps richly deserved?—disaster, Edmond Hamilton has tried not to be corny about it. The result has been that most of Hamilton's stories leave you with something to think about. Devolution *is no exception. It provides a good counter-irritant for Darwin's theories, but one which the Fundamentalists would be equally loathe to accept.*

ROSS had ordinarily the most even of tempers, but four days of canoe travel in the wilds of North Quebec had begun to rasp it. On this, their fourth stop on the bank of the river to camp for the night, he lost control and for a few moments stood and spoke to his two companions in blistering terms.

His black eyes snapped and his darkly unshaven handsome young face worked as he spoke. The two biologists listened to him without reply at first. Gray's blond young countenance was indignant but Woodin, the older biologist, just listened impassively with his gray eyes level on Ross' angry face.

When Ross stopped for breath, Woodin's calm voice struck in. "Are you finished?"

Ross gulped as though about to

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resume his tirade, then abruptly got hold of himself. "Yes, I'm finished," he said sullenly.

"Then listen to me," said Woodin, like a middle-aged father admonishing a sulky child.

"You're working yourself up over nothing. Neither Gray nor I have made one complaint yet. Neither of us have once said that we disbelieve what you told us."

"You haven't *said* you disbelieve, no!" Ross exclaimed with anger suddenly reflaring. "But don't you suppose I can tell what you're thinking?"

"You think I told you a fairy story about the things I saw from my plane, don't you? You think I dragged you two up here on a wild-goose chase, to look for incredible creatures that could never have existed. You believe that, don't you?"

"Oh, *damn* these mosquitoes!" said Gray, slapping viciously at his neck and staring with unfriendly eyes at the aviator.

Woodin took command. "We'll go over this after we've made camp. Jim, get out the dufflebags. Ross, will you rustle firewood?"

They both glared at him and at each other but grudgingly they obeyed. The tension eased for a while.

By the time darkness fell on the little riverside clearing, the canoe was drawn up on the bank, their trim little balloon-silk tent had been erected, and a fire crackled in front of it. Gray fed the fire with fat knots of pine while Woodin cooked over it coffee, hot cakes and the inevitable bacon.

The firelight wavered feebly up toward the tall trunks of giant hemlocks that walled the little clearing on three sides. It lit up their three khaki-clad, stained figures and the irregular white block of the tent. It gleamed out there on the riffles of the McNorton, chuckling softly as it flowed on toward the Little Whale.

They ate silently, and as wordlessly cleaned the pans with bunches of grass. Woodin got his pipe going, the other two lit crumpled cigarettes, and then they sprawled for a time by the fire, listening to the chuckling, whispering river-sounds, the sighing sough of the higher hemlock branches, the lonesome cheeping of insects.

Woodin finally knocked his pipe out on his bootheel and sat up.

"All right," he said, "now we'll settle this argument we were having."

Ross looked a little shamefaced. "I guess I got too hot about it," he said subduedly. Then added, "But all the same, you fellows do more than half disbelieve me."

Woodin shook his head calmly.



He stood there in a circle of the glistening monsters, his hands and body trembling violently.

"No, we don't, Ross. When you told us that you'd seen creatures unlike anything ever heard of while flying over this wilderness, Gray and I both believed you."

"If we hadn't, do you think two busy biologists would have dropped their work to come up here with you into these unending woods and look for the things you saw?"

"I know, I know," said the aviator unsatisfiedly. "You think I saw something queer and you're taking a chance that it will be worth the trouble of coming up here after."

"But you don't believe what I've told you about the looks of the things. You think that sounds too queer to be true, don't you?"

For the first time Woodin hesitated in answering. "After all, Ross", he said indirectly, "one's eyes can play tricks when you're only glimpsing things for a moment from a plane a mile up."

"Glimpsing them?" echoed Ross. "I tell you, man, I saw them as clearly as I see you. A mile up, yes, but I had my big binoculars with me and was using them when I saw them.

"It was near here, too, just east of the forks of the McNorton and the Little Whale. I was streaking south in a hurry for I'd been three weeks up at that government mapping survey on Hudson's Bay. I wanted to place myself by the river forks so I brought my plane down a little and used my binoculars.

"Then, down there in a clearing by the river, I saw something glisten and saw—the things. I tell you, they were incredible, but just the same I saw them clear! I forgot all about the river-forks in the moment or two I stared down at them.

"They were big, glistening things like heaps of shining jelly, so translucent that I could see the ground through them. There were at least a dozen of them and when I saw them they were gliding across that little clearing, a floating, flowing movement.

"Then they disappeared under the trees. If there'd been a clearing big enough to land in within a hundred miles I'd have landed and looked for them, but there wasn't and I had to go on. But I wanted like the devil to find out what they were and when I took the story to you two, you agreed to come up here by canoe to search for them. But I don't think now you've ever fully believed me."

WOODIN looked thoughtfully into the fire. "I think you saw something queer, all right, some queer form of life. That's why I was willing to come up on this search."

"But things such as you describe, jelly-like, translucent,

gliding over the ground like that —there's been nothing like that since the first protoplasmic creatures, the beginning of life on earth, glided over our young world ages ago."

"If there were such things then, why couldn't they have left descendants like them?" Ross argued.

Woodin shook his head. "Because they all vanished ages ago, changed into different and higher forms of life, starting the great upward climb of life that has reached its height in man.

"Those long-dead, single-celled protoplasmic creatures were the start, the crude, humble beginnings of our life. They passed away and their descendants were unlike them. We men are their descendants."

Ross looked at him, frowning. "But where did they come from in the first place, those first living things?"

Again Woodin shook his head. "That is one thing we biologists do not know and can hardly speculate upon, the origin of those first protoplasmic forms of life.

"It's been suggested that they rose spontaneously from the chemicals of earth, yet this is disproved by the fact that no such things rise spontaneously *now* from inert matter. Their origin is still a complete mystery. But, however, they came into existence on earth, they were the first of life, our distant ancestors."

Woodin's eyes were dreaming, the other two forgotten, as he stared into the fire, seeing visions.

"What a glorious saga it is, that wonderful climb up from crude protoplasm creatures to man! A marvelous series of changes that has brought us from that first low form to our present splendor."

"And it might not have occurred on any other world but earth! For science is now almost sure that the cause of evolutionary mutations is the radiations of the radioactive deposits inside the earth, acting upon the genes of all living matter."

He caught a glimpse of Ross' uncomprehending face, and despite his raptness smiled a little.

"I can see that means nothing to you. I'll try to explain. The germ-cell of every living thing on earth contains in it a certain number of small, rod-like things which are called chromosomes.

"These chromosomes are made up of strings of tiny particles which we call genes. And each of these genes has a potent and different controlling effect upon the development of the creature that grows from that germ-cell.

"Some of these genes control the creature's color, some control his size, some the shape of his limbs, and so on. Every charac-

teristic of the creature is predetermined by the genes in its original germ-cell.

"But now and then the genes in a germ-cell will be greatly different from the genes normal to that species, and when that is so, the creature that grows from that germ-cell will be greatly different from the fellow-creatures of its species. He will be, in fact, of an entirely new species. That is the way in which new species come into existence on earth, the method of evolutionary change.

"Biologists have known this for some time and they have been searching for the cause of these sudden great changes, these mutations, as they are called. They have tried to find out what it is that affects the genes so radically.

"They have found experimentally that X-Rays and chemical rays of various kinds, when turned upon the genes of a germ-cell, will change them greatly. And the creature that grows from that germ-cell will thus be greatly changed, a mutant.

"Because of this, many biologists now believe that the radiation from the radioactive deposits inside earth, acting upon all the genes of every living thing on earth, are what cause the constant change of species, the procession of mutations, that has brought life up the evolutionary road to its present height.

"That is why I say that on any other world but earth, evolutionary progress might never have happened. For it may be that no other world has similar radioactive deposits within it to cause by gene-effect the mutations. On any other world, the first protoplasmic things that began life might have remained forever the same, down through endless generations.

"How thankful we ought to be that it was not so on earth! That mutation after mutation has followed, life ever changing and progressing into new and higher species, until the first crude protoplasm things have advanced through countless changing forms into the supreme achievement of man!"

WOODIN'S enthusiasm had carried him away as he talked but now he stopped, laughing a little as he relit his pipe.

"Sorry that I lectured you like a college freshman, Ross. But that's my chief subject of thought, my *idée fixé*, that wonderful upward climb of life through the ages."

Ross was staring thoughtfully into the fire. "It does seem wonderful the way you tell it. One species changing into another, going higher all the time—"

Gray stood up by the fire and stretched. "Well, you two can wonder over it but this crass ma-

terialist is going to emulate his remote invertebrate ancestors and return to a prostrate position. In other words, I'm going to bed."

He looked at Ross, a doubtful grin on his blond young face, and said, "No hard feelings now?"

"Forget it," the aviator grinned back. "The paddling *was* hard today and you fellows did look *mighty* skeptical.

"But you'll see! To-morrow we'll be at the forks of the Little Whale and then I'll bet we won't scout an hour before we run across those jelly-creatures.

"I hope so," said Woodin yawningly. "Then we'll see just how good your eyesight is from a mile up, and whether you've yanked two respectable scientists up here for nothing."

Later as he lay in his blankets in the little tent, listening to Gray and Ross snore and looking sleepily out at the glowing fire embers, Woodin wondered again about that.

What had Ross actually seen in that fleeting glimpse from his speeding plane? Something queer, Woodin was sure of that, so sure that he'd come on this hard trip to find it. But what exactly?

Not protoplasmic things such as he described. That couldn't be, of course. Or could it? If things like that had existed once, why couldn't they—couldn't they—

Woodin didn't know he'd been sleeping until he was wakened by Gray's cry. It wasn't a nice cry, it was the hoarse yell of someone suddenly assaulted by bone-freezing terror.

He opened his eyes at that cry to see the Incredible looming against the stars in the open door of the tent. A dark, amorphous mass humped there in the opening, glistening all over in the starlight, and gliding into the tent. Behind it were others like it.

Things happened very quickly then. They seemed to Woodin to happen not consecutively but in a succession of swift, clicking scenes like the successive pictures of a motion picture film.

Gray's pistol roared red flame at the first viscous monster entering the tent, and the momentary flash showed the looming, glistening bulk of the thing, and Gray's panic-frozen face, and Ross clawing in his blankets for his pistol.

THEN the scene was over and instantly there was another one, Gray and Ross both stiffening suddenly as though petrified, both falling heavily over. Woodin knew they were both dead now, but didn't know how he knew it. The glistening monsters were coming on into the tent.

He ripped up the wall of the tent and plunged out into the

cold starlight of the clearing. He ran three steps, he didn't know in what direction, and then he stopped. He didn't know why he stopped dead but he did.

He stood there, his brain desperately urging his limbs to fly, but his limbs would not obey. He couldn't even turn, could not move a muscle of his body. He stood, his face toward the starlit gleam of the river, stricken by a strange and utter paralysis.

Woodin heard rustling, gliding movements in the tent behind him. Now from behind, there came into the line of his vision several of the glistening things. They were gathering around him, a dozen of them it seemed. He now could see them quite clearly.

They weren't nightmares, no. They were real, poised here around him, humped, amorphous masses of viscous, translucent jelly. Each was about four feet tall and three in diameter, though their shapes kept constantly changing slightly, making dimensions hard to guess.

At the center of each translucent mass was a dark, disk-like blob or nucleus. There was nothing else to the creatures, no limbs or sense-organs. He saw that they could protrude pseudopods, though, for two, who held the bodies of Gray and Ross in such tentacles, were now bringing them out and laying them down beside Woodin.

Woodin, still quite unable to move a muscle, could see the frozen, twisted faces of the two men, and could see the pistols still gripped in their dead hands. And then as he looked on Ross' face he remembered.

The things the aviator had seen from his plane, the jelly-creatures they had come north to search for, they were the monsters around him! But how had they killed Ross and Gray, how were they holding him petrified like this, who were they?

"We will permit you to move but you must not try to escape."

Woodin's dazed brain numbed further with wonder. Who had said those words to him? He had heard nothing, yet he had *thought* he heard.

"We will let you move but you must not attempt to escape or harm us."

He *did* hear those words in his mind, even though his ears heard no sound. And now his brain heard more.

"We are speaking to you by transference of thought impulses. Have you sufficient mentality to understand us?"

Mind? Minds in these things? Woodin was shaken by the thought as he stared at the glistening monsters.

His thought apparently had reached them. "Of course we have minds," came the thought answer into his brain. "We are

going to let you move, now, but do not try to flee."

"I—I won't try," Woodin told himself mentally.

At once the paralysis that held him abruptly lifted. He stood there in the circle of the glistening monsters, his hands and body trembling violently.

There were ten of them, he saw now. Ten monstrous, humped masses of shining, translucent jelly, gathered around him like cowled and faceless genii come from some haunt of the unknown. One stood closer to him than the others, apparently spokesman and leader.

Woodin looked slowly around their circle, then down at his two dead companions. In the midst of the unfamiliar terrors that froze his soul, he felt a sudden aching pity as he looked down at them.

Came another strong thought into Woodin's mind from the creature closest him. "We did not wish to kill them, we came here simply to capture and communicate with the three of you.

"But when we sensed that they were trying to kill us, we slew quickly. You, who did not try to kill us but fled, we harmed not."

"What—what do you want with us, with me?" Woodin asked through dry lips.

There was no mental answer this time. The things stood unmoving, a silent ring of brooding, unearthly figures.

Woodin felt his mind snapping under the strain of the silence and he asked the question again, screamed it.

This time the mental answer came. "I did not answer, because I was probing your mentality to ascertain whether you are of sufficient intelligence to comprehend our ideas.

"While your mind seems of an exceptionally low order, it seems possible that it can appreciate enough of what we wish to convey to understand us.

"Before beginning, however, I warn you again that it is quite impossible for you to escape or to harm any of us and that attempts to do so will result disastrously for you. It is apparent you know nothing of mental energy, so I will inform you that your two fellow-creatures were killed by the sheer power of our wills, and that your muscles were held unresponsive to your brain's commands by the same power. By our mental energy we could completely annihilate your body, if we chose.

THERE was a pause, and in that little space of silence Woodin's dazed brain clutched desperately for sanity, for steadiness.

Then came again that mental voice that seemed so like a real voice speaking in his brain.

"We are children of a galaxy

whose name, as nearly as it can be approximated in your tongue, is Arctar. The galaxy of Arctar lies so many million light-years from this galaxy that it is far around the curve of the sphere of the three-dimensional cosmos.

"We came to dominance in that galaxy long ages ago. For we were creatures who could utilize our mental energy for transport, for physical power, for producing almost any effect we required. Because of this we rapidly conquered and colonized that galaxy, travelling from sun to sun without need of any vehicle.

"Having brought all the matter of the galaxy Arctar under our control, we looked out upon the realms beyond. There are approximately a thousand million galaxies in the three-dimensional cosmos, and it seemed fitting to us that all the matter in the cosmos should in time be brought under our control.

"Our first step was to proliferate our numbers so as to multiply our number to that required for the great task of colonization of the cosmos. This was not difficult since, of course, reproduction with us is a matter of mere fission. When the requisite number of us were ready, they were divided into four forces.

"Then the whole sphere of the three-dimensional cosmos was quartered out among those four forces. Each was to colonize its division of the cosmos and so in their tremendous hosts they set out from Arctar, in four different directions.

"A part of one of these forces came to this galaxy of yours eons ago and spread out deliberately to colonize all its habitable worlds. All this took great lengths of time, of course, but our lives are of length vastly exceeding yours, and we comprehend that racial achievement is everything and individual achievement is nothing. In the colonization of this galaxy, a force of several million Arctarians came to this particular sun and, finding but this one planet of its nine nearer worlds habitable, settled here.

"Now it has been the rule that the colonists of all these worlds throughout the cosmos have kept in communication with the original home of our race, the galaxy Arctar. In that way, our people, who now hold the whole cosmos, are able to concentrate at one point all their knowledge and power, and from that point go forth commands that shape great projects for the cosmos.

"But from this world no communications have ever been received since shortly after the force of colonizing Arctarians came here. When this was first noted the matter was deferred, it being thought that within a few more million years report would surely be made from this world

too. But still no word came, until after more than a thousand million years of this silence the directing council at Arctar ordered an expedition sent to this world to ascertain the reason for such silence on the part of its colonists.

"We ten form that expedition and we started from one of the worlds of the sun you call Sirius, a short distance from your own sun, where we too are colonists. We were ordered to come with full speed to this world and ascertain why its colonists had made no report. So, wafting ourselves by mental energy through the void, we crossed the span from sun to sun and a few days ago arrived on your world.

"Imagine our perplexity when we floated down here on your world! Instead of a world peopled in every square mile by Arctarians like ourselves, descended from the original colonists, a world completely under their mental control, we find a planet that is largely a wilderness of weird forms of life!

"We remained at this spot where we had landed and for some time sent our vision forth and scanned this whole globe mentally. And our perplexity increased for never had we seen such grotesque and degraded forms of life as presented themselves to us. And not one Arctarian was to be seen on this whole planet.

"This has sorely perplexed us, for what could have done away with the Arctarians who colonized this world? Our mighty colonists and their descendants surely could never have been overcome and destroyed by the pitifully weak mentalities that now inhabit this globe. Yet where, when, are they?

"That is why we sought to seize you and your companions. Low as we knew your mentalities must be, it seemed that surely even such as you would know what had become of our colonists who once inhabited this world."

The thought-stream paused a moment, then raced into Woodin's mind with a clear question.

"Have you not some knowledge of what became of our colonists? Some clue as to their strange disappearance?"

The numbed biologist found himself shaking his head slowly. "I never—I never heard before of such creatures as you, such minds. They never existed on earth that we know of, and we now know almost all of the history of earth."

"Impossible!" exclaimed the thought of the Arctarian leader. "Surely you must have some knowledge of our mighty people if you know all the history of this planet."

From another Arctarian's

mind came a thought, directed at the leader but impinging indirectly on Woodin's brain.

"Why not examine the past of the planet through this creature's brain and see what we can for ourselves?"

"An excellent idea!" exclaimed the leader. "His mentality will be easy enough to probe."

"What are you going to do?" cried Woodin shrilly, panic edging his voice.

The answering thoughts were calming, reassuring. "Nothing that will harm you in the least. We are simply going to probe into your racial past by unlocking the inherited memories of your brain.

"In the unused cells of your brain lie impressed inherited racial memories that go back to your remotest ancestors. By our mental power of command we shall make those buried memories temporarily dominant and vivid in your mind.

"You will experience the same sensations, see the same scenes, that your remote ancestors of millions of years ago saw. And we, here around you, can read your mind as we now do, and so see what you are seeing, looking into the past of this planet.

"There is no danger. Physically you will remain standing here but mentally you will leap back across the ages. We shall first push your mind back to a time approximating that when our colonists came to this world, to see what happened to them."

NO SOONER had this thought impinged on Woodin's mind than the starlit scene around him, the humped masses of the Arctarians, suddenly vanished and his consciousness seemed whirling through gray mist.

He knew that physically he was not moving yet mentally he had a sense of terrific velocity of motion. It was as though his mind was whirling across unthinkable gulfs, his brain expanding.

Then abruptly the gray mists cleared. A strange new scene took hazy form inside Woodin's mind.

It was a scene that he sensed, not saw. By other senses than sight did it present itself to his mind, yet it was none the less real and vivid.

He looked with those strange senses upon a strange earth, a world of gray seas and harsh continents of rock without any speck of life upon them. The skies were heavily clouded and rain fell continually.

Down upon that world Woodin felt himself dropping with a host of weird companions. They were each an amorphous, glistening, single-celled mass, with a dark nucleus at its center. They were Arctarians and Woodin knew that *he* was an Arctarian,

and that he had come with the others a long way through space toward this world.

They landed in hosts upon the harsh and lifeless planet. They exerted their mentalities and by sheer telekinetic force of mental energy they altered the material world to suit them. They reared great structures and cities, cities that were not of matter but of *thought*. Weird cities built of crystallized mental energy.

Woodin could not comprehend a millionth of the activities he sensed going on in those alien Arctarian cities of thought. He realized a vast ordered mass of inquiry, investigation, experiment and communication, but all beyond his present human mind in motives and achievement. Abruptly all dissolved in gray mists again.

The mists cleared almost at once and now Woodin looked on another scene. It was later in time, this one. And now Woodin saw that time had worked strange changes upon the hosts of Arctarians, of which he still was one.

They had changed from unicellular to multicellular beings. And they were no longer all the same. Some were sessile, fixed in one spot, others mobile. Some betrayed a tendency toward the water, others toward the land. Something had changed the bodily form on the Arctarians as generations passed, branching them out in different lines.

This strange degeneration of their bodies had been accompanied by a kindred degeneration of their minds. Woodin sensed that. In the thought-cities the ordered process of search for knowledge and power had become confused, chaotic. And the thought-cities themselves were vanishing, the Arctarians having no longer sufficient mental energy to maintain them.

The Arctarians were trying to ascertain what was causing this strange bodily and mental degeneration in them. They thought it was something that was affecting the genes of their bodies, but what it was they could not guess. On no other world had they ever degenerated so!

That scene passed rapidly into another much later. Woodin now *saw* the scene, for by then the ancestor, whose mind he looked through, had developed eyes. And he saw that the degeneration had now gone far, the Arctarians' multicellular bodies more and more stricken by the diseases of complexity and diversification.

THE LAST of the thought-cities now were gone. The once mighty Arctarians had become hideous, complex organisms degenerating ever further, some of

them creeping and swimming in the waters, others fixed upon the land.

They still had left some of the great original mentality of their ancestors. These monstrously-degenerated creatures of land and sea, living in what Woodin's mind recognized as the late Paleozoic age, still made frantic and futile attempts to halt the terrible progress of their degradation.

Woodin's mind flashed into a scene later still, in the Mesozoic. Now the spreading degeneration had made of the descendants of the colonists a still more horrible group of races. Great webbed and scaled and taloned creatures they were now, reptiles living in land and water.

Even these incredibly-changed creatures possessed a faint remnant of their ancestor's mental power. They made vain attempts to communicate with Arctarians far on other worlds of distant suns, to apprise them of their plight. But their minds were now too weak.

There followed a scene in the Cenozoic. The reptiles had become mammals, the downward progress of the Arctarians had gone farther. Now only the merest shreds of the original mentality remained in these degraded descendants.

And now this pitiful posterity had produced a species even more foolish and lacking in mental power than any before, ground-apes that roamed the cold plains in chattering, quarreling packs. The last shreds of Arctarian inheritance, the ancient instincts toward dignity and cleanliness and forebearance, had faded out of these creatures.

And then a last picture filled Woodin's brain. It was the world of the present day, the world he had seen through his own eyes. But now he saw and understood it as he never had before, a world in which degeneration had gone to the utmost limit.

The apes had become even weaker bipedal creatures, who had lost almost every atom of inheritance of the old Arctarian mind. These creatures had lost, too, many of the senses which had been retained even by the apes before them.

And these creatures, these humans, were now degenerating with increasing rapidity. Where at first they had killed like their animal forbears only for food, they had learned to kill wantonly. And had learned to kill each other in groups, in tribes, in nations and hemispheres. In the madness of their degeneracy they slaughtered each other until earth ran with their blood.

They were more cruel even than the apes who had preceded them, cruel with the utter cruelty of the mad. And in their pro-

gressive insanity they came to starve in the midst of plenty, to slay each other in their own cities, to cower beneath the lash of superstitious fears as no creatures had before them.

They were the last terrible descendants, the last degenerated product, of the ancient Arctarian colonists who once had been kings of intellect. Now the other animals were almost gone. These, the last hideous freaks, would soon wind up the terrible story entirely by annihilating each other in their madness.

WOODIN came suddenly to consciousness. He was standing in the starlight in the center of the riverside clearing. And around him still were poised the ten amorphous Arctarians, a silent ring.

Dazed, reeling from the tremendous and awful vision that has passed through his mind with incredible vividness, he turned slowly from one to the other of the Arctarians. Their thoughts impinged on his brain, strong, somber, shaken by terrible horror and loathing.

The sick thought of the Arctarian leader beat into Woodin's mind.

"So *that* is what became of our Arctarian colonists who came to this world! They degenerated, changed into lower and lower forms of life, until these pitiful insane things, who now swarm on this world, are their last descendants.

"This world is a world of deadly horror! A world that somehow damages the genes of our race's bodies and changes them bodily and mentally, making them degenerate further each generation. Before us we see the awful result."

The shaken thought of another Arctarian asked, "But what can we do now?"

"There is nothing we can do," uttered their leader solemnly. "This degeneration, this awful change, has gone too far for us ever to reverse it now.

"Our intelligent brothers became on this poisoned world things of horror and we cannot now turn back the clock and restore them from the degraded things their descendants are."

Woodin found his voice and cried out thinly, shrilly.

"It isn't true!" he cried. "It's all a lie, what I saw! We humans aren't the product of downward devolution, we're the product of ages of upward evolution! We must be, I tell you! Why, we wouldn't want to live, I wouldn't want to live, if that other tale was true. It can't be true!

The thought of the Arctarian leader, directed at the other amorphous shapes, reached his raving mind.

It was tinged with pity, yet strong with a superhuman loathing.

"Come, my brothers," the Arctarian was saying to his fellows. "There is nothing we can do here on this soul-sickening world.

"Let us go, before we too are poisoned and changed. And we will send warning to Arctar that this world is a poisoned world, a world of degeneration, so that never again may any of our race come here and go down the awful road that those others went down.

"Come! We return to our own sun."

The Arctarian leader's humped shape flattened, assumed a disk-like form, then rose smoothly upward into the air.

The others too changed and followed, in a group, and a stupefied Woodin stared up at them, glistening dots lifting rapidly into the starlight.

He staggered forward a few steps, shaking his fist furiously, insanely up at the shining, receding dots.

"Come back, damn you!" he screamed. "Come back and tell me it's a lie!

"It must be a lie—it must—"

There was no sign of the vanished Arctarians now in the starlit sky. The darkness was brooding and intense around Woodin.

He screamed up again into the night but only a whispering echo answered. Wild-eyed, staggering, soul-smitten, his gaze fell on the pistol in Ross' hand. He seized it with a hoarse cry.

The stillness of the forest was broken suddenly by a sharp crack, that reverberated a moment and then died rapidly away. Then all was silent again save for the chuckling whisper of the river hurrying on.

THE END

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A Classic Reprint from AMAZING STORIES, November, 1930

The Cosmic Express

By JACK WILLIAMSON

Introduction by Sam Moskowitz

THE year 1928 was a great year of discovery for AMAZING STORIES. *They were uncovering new talent at such a great rate, (Harl Vincent, David H. Keller, E. E. Smith, Philip Francis Nowlan, Fletcher Pratt and Miles J. Breuer), that Jack Williamson barely managed to become one of a distinguished group of discoveries by stealing the cover of the December issue for his first story* The Metal Man.

A disciple of A. Merritt, he attempted to imitate in style, mood and subject the magic of that late lamented master of fantasy. The imitation found great favor from the readership and almost instantly Jack Williamson became an important name on the contents page of AMAZING STORIES. *He followed his initial success with two short novels,* The Green Girl *in* AMAZING STORIES *and* The Alien Intelligence *in* SCIENCE WONDER STORIES, *another Gernsback publication. Both of these stories were close copies of A. Merritt, whose style and method Jack Williamson parlayed into popularity for eight years.*

Yet the strange thing about it was that Jack Williamson was one of the most versatile science fiction authors ever to sit down at the typewriter. When the vogue for science-fantasy altered to super science, he created the memorable super lock-picker Giles Habilula as the major attraction in a rousing trio of space operas, The Legion of Space, The Cometeers *and* One Against the Legion. *When grim realism was the order of the day, he produced* Crucible of Power *and when they wanted extrapolated theory in present tense, he assumed the disguise of Will Stewart and popularized the concept of contra terrene matter in science fiction with* Seetee Ship *and* Seetee Shock. *Finally, when only psychological studies of the future would do, he produced* "With

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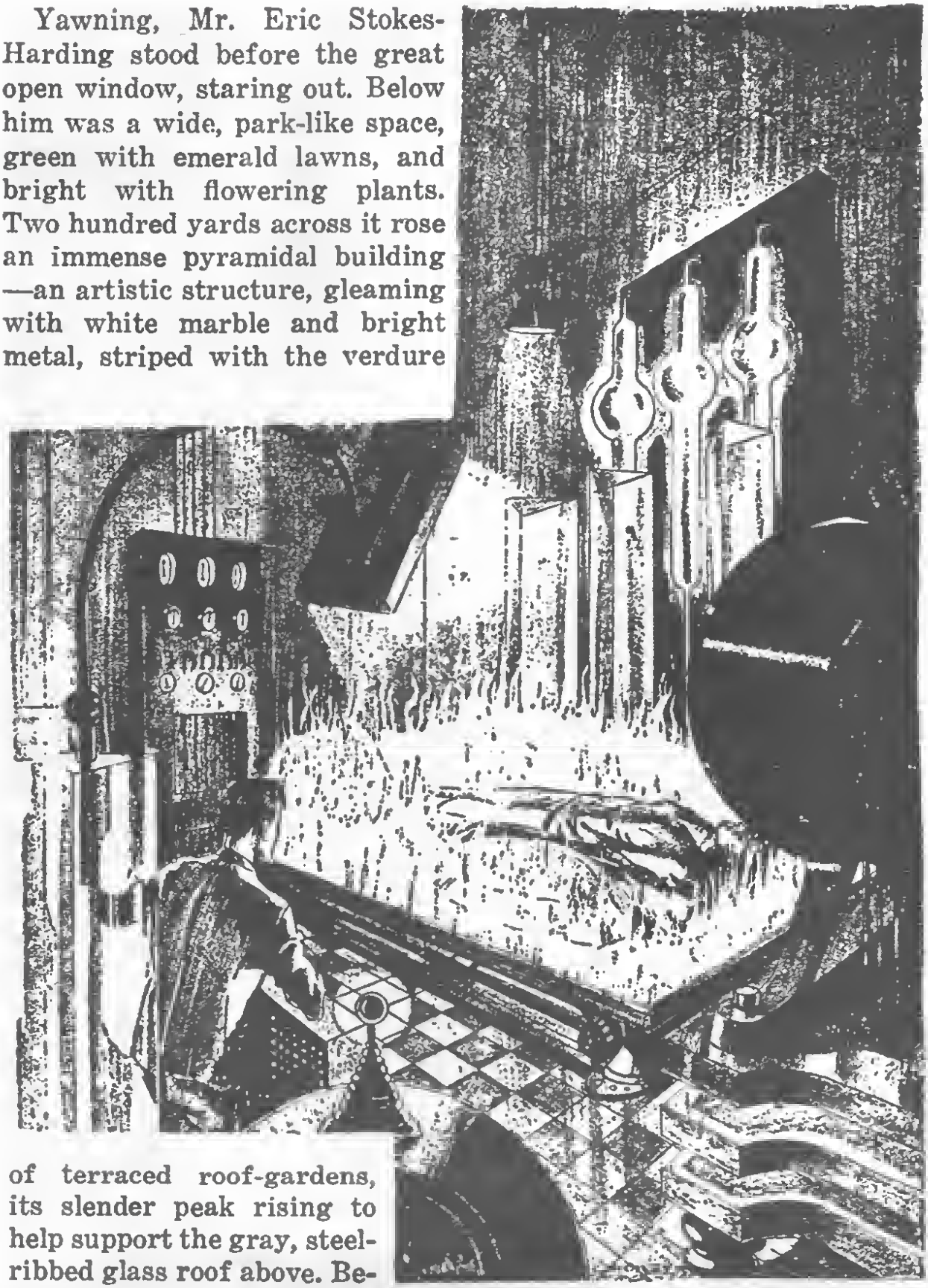
Folded Hands . . ." ". . . And Searching Mind."

The Cosmic Express *is of special interest because it was written during Williamson's A. Merritt "kick," when he was writing little else but, and it gave the earliest indication of a more general capability. The lightness of the handling is especially modern, barely avoiding the farcical by the validity of the notion that wireless transmission of matter is the next big transportation frontier to be conquered. It is especially important because it stylistically forecast a later trend to accept the background for granted, regardless of the quantity of wonders, and proceed with the story. With only a few thousand scanning-disk television sets in existence at the time of the writing, the surmise that this media would be a natural for westerns was particularly astute.*

Jack Williamson was born in 1908 in the Arizona territory when covered wagons were the primary form of transportation and apaches still raided the settlers. His father was a cattle man, but for young Jack, the ranch was anything but glamorous. "My days were filled," he remembers, "with monotonous rounds of what seemed an endless, heart-breaking war with drought and frost and dust-storms, poison-weeds and hail, for the sake of survival on the Llano Estacada." *The discovery of* AMAZING STORIES *was the escape he sought and his goal was to be a science fiction writer. He labored to this end and the first he knew that a story of his had been accepted was when he bought the December, 1929 issue of* AMAZING STORIES. *Since then, he has written millions of words of science fiction and has gone on record as follows: "I feel that science-fiction is the folklore of the new world of science, and the expression of man's reaction to a technological environment. By which I mean that it is the most interesting and stimulating form of literature today."*

MR. ERIC STOKES-HARDING tumbled out of the rumpled bed-clothing, a striking slender figure in purple-striped pajamas. He smiled fondly across to the other of the twin beds, where Nada, his pretty bride, lay quiet beneath light silk covers. With a groan, he stood up and began a series of fantastic bending exercises. But after a few half-hearted movements, he gave it up, and walked through an open door into a small bright room, its walls covered with bookcases and also with scientific appliances that would have been strange to the man of four or five centuries before, when the Age of Aviation was beginning.

Yawning, Mr. Eric Stokes-Harding stood before the great open window, staring out. Below him was a wide, park-like space, green with emerald lawns, and bright with flowering plants. Two hundred yards across it rose an immense pyramidal building —an artistic structure, gleaming with white marble and bright metal, striped with the verdure of terraced roof-gardens, its slender peak rising to help support the gray, steel-ribbed glass roof above. Beyond, the park stretched away in illimitable vistas, broken with the graceful columned buildings



Suddenly there was a sharp tingling sensation where they touched the polished surface.

that held up the great glass roof.

Above the glass, over this New York of 2432 A. D., a freezing blizzard was sweeping. But small concern was that to the lightly clad man at the window, who was inhaling deeply the fragrant air from the plants below—air kept, winter and summer, exactly at 20° C.

With another yawn, Mr. Eric Stokes-Harding turned back to the room, which was bright with the rich golden light that poured in from the suspended globes of the cold ato-light that illuminated the snow-covered city. With a distasteful grimace, he seated himself before a broad, paper-littered desk, sat a few minutes leaning back, with his hands clasped behind his head. At last he straightened reluctantly, slid a small typewriter out of its drawer, and began pecking at it impatiently.

For Mr. Eric Stokes-Harding was an author. There was a whole shelf of his books on the wall, in bright jackets, red and blue and green, that brought a thrill of pleasure to the young novelist's heart when he looked up from his clattering machine.

He wrote "thrilling action romances," as his enthusiastic publishers and television directors said, "of ages past, when men were men. Red-blooded heroes responding vigorously to the stirring passions of primordial life!"

HE WAS impartial as to the source of his thrills—provided they were distant enough from modern civilization. His hero was likely to be an ape-man roaring through the jungle, with a bloody rock in one hand and a beautiful girl in the other. Or a cowboy, "hard-riding, hard-shooting," the vanishing hero of the ancient ranches. Or a man marooned with a lovely woman on a desert South Sea island. His heroes were invariably strong, fearless, resourceful fellows, who could handle a club on equal terms with a cave-man, or call science to aid them in defending a beautiful mate from the terrors of a desolate wilderness.

And a hundred million read Eric's novels, and watched the dramatization of them on the television screens. They thrilled at the simple, romantic lives his heroes led, paid him handsome royalties, and subconsciously shared his opinion that civilization had taken all the best from the life of man.

Eric had settled down to the artistic satisfaction of describing the sensuous delight of his hero in the roasted marrow-bones of a dead mammoth, when the pretty woman in the other room stirred, and presently came tripping into the study, gay and vivacious, and—as her husband of a few months most justly

thought—altogether beautiful in a bright silk dressing gown.

Recklessly, he slammed the machine back into its place, and resolved to forget that his next "red-blooded action thriller" was due in the publisher's office at the end of the month. He sprang up to kiss his wife, held her embraced for a long happy moment. And then they went hand in hand, to the side of the room and punched a series of buttons on a panel—a simple way of ordering breakfast sent up the automatic shaft from the kitchens below.

Nada Stokes-Harding was also an author. She wrote poems—"back to nature stuff"—simple lyrics of the sea, of sunsets, of bird songs, of bright flowers and warm winds, of thrilling communion with Nature, and growing things. Men read her poems and called her a genius. Even though the whole world had grown up into a city, the birds were extinct, there were no wild flowers, and no one had time to bother about sunsets.

"Eric, darling," she said, "isn't it terrible to be cooped up here in this little flat, away from the things we both love?"

"Yes, dear. Civilization has ruined the world. If we could only have lived a thousand years ago, when life was simple and natural, when men hunted and killed their meat, instead of drinking synthetic stuff, when men still had the joys of conflict, instead of living under glass, like hot-house flowers."

"If we could only go somewhere—"

"There isn't anywhere to go. I write about the West, Africa, South Sea Islands. But they were all filled up two hundred years ago. Pleasure resorts, sanatoriums, cities, factories."

"If only we lived on Venus! I was listening to a lecture on the television, last night. The speaker said that the Planet Venus is younger than the Earth, that it has not cooled so much. It has a thick, cloudy atmosphere, and low, rainy forests. There's simple, elemental life there—like Earth had before civilization ruined it."

"Yes, Kinsley, with his new infra-red ray telescope, that penetrates the cloud layers of the planet, proved that Venus rotates in about the same period as Earth; and it must be much like Earth was a million years ago."

"Eric, I wonder if we could go there! It would be so thrilling to begin life like the characters in your stories, to get away from this hateful civilization, and live natural lives. Maybe a rocket—"

THE young author's eyes were glowing. He skipped across the floor, seized Nada, kissed her ecstatically. "Splendid! Think of hunting in the virgin forest, and

bringing the game home to you! But I'm afraid there is no way. —Wait! The Cosmic Express."

"The Cosmic Express?"

"A new invention. Just perfected a few weeks ago, I understand. By Ludwig Von der Valls, the German physicist."

"I've quit bothering about science. It has ruined nature, filled the world with silly, artificial people, doing silly, artificial things."

"But this is quite remarkable, dear. A new way to travel—by ether!"

"By ether!"

"Yes. You know of course that energy and matter are interchangeable terms; both are simply etheric vibration, of different sorts."

"Of course. That's elementary." She smiled proudly. "I can give you examples, even of the change. The disintegration of the radium atom, making helium and lead and *energy*. And Millikan's old proof that his Cosmic Ray is generated when particles of electricity are united to form an atom."

"Fine! I thought you said you weren't a scientist." He glowed with pride. "But the method, in the new Cosmic Express, is simply to convert the matter to be carried into power, send it out as a radiant beam and focus the beam to convert it back into atoms at the destination."

"But the amount of energy must be terrific—"

"It is. You know short waves carry more energy than long ones. The Express Ray is an electromagnetic vibration of frequency far higher than that of even the Cosmic ray, and correspondingly more powerful and more penetrating."

The girl frowned, running slim fingers through golden-brown hair. "But I don't see how they get any recognizable object, not even how they get the radiation turned back into matter."

"The beam is focused, just like the light that passes through a camera lens. The photographic lens, using light rays, picks up a picture and reproduces it again on the plate—just the same as the Ex-Press Ray picks up an object and sets it down on the other side of the world.

"An analogy from television might help. You know that by means of the scanning disc, the picture is transformed into mere rapid fluctuations in the brightness of a beam of light. In a parallel manner, the focal plane of the Express Ray moves slowly through the object, progressively, dissolving layers of the thickness of a single atom; which are accurately reproduced at the other focus of the instrument—which might be in Venus!

"But the analogy of the lens is the better of the two. For no

receiving instrument is required, as in television. The object is built up of an infinite series of plane layers, at the focus of the ray, no matter where that may be. Such a thing would be impossible with radio apparatus because even with the best beam transmission, all but a tiny fraction of the power is lost, and power is required to rebuild the atoms. Do you understand, dear?"

"Not altogether. But I should worry! Here comes breakfast. Let me butter your toast."

A bell had rung at the shaft. She ran to it, and returned with a great silver tray, laden with dainty dishes, which she set on a little side table. They sat down opposite each other, and ate, getting as much satisfaction from contemplation of each other's faces as from the excellent food. When they had finished, she carried the tray to the shaft, slid it in a slot, and touched a button —thus disposing of the culinary cares of the morning.

She ran back to Eric, who was once more staring distastefully at his typewriter.

"Oh, darling! I'm thrilled to death about the Cosmic Express! If we could go to Venus, to a new life on a new world, and get away from all this hateful conventional society—"

"We can go to their office—it's only five minutes. The chap that operates the machine for the company is a pal of mine. He's not supposed to take passengers except between the offices they have scattered about the world. But I know his weak point—"

Eric laughed, fumbled with a hidden spring under his desk. A small polished object, gleaming silvery, slid down into his hand.

"Old friendship, *plus* this, would make him—like spinach."

FIVE minutes later Mr. Eric Stokes-Harding and his pretty wife were in street clothes, light silk tunics of loose, flowing lines—little clothing being required in the artificially warmed city. They entered an elevator and dropped thirty stories to the ground floor of the great building.

There they entered a cylindrical car, with rows of seats down the sides. Not greatly different from an ancient subway car, except that it was air-tight, and was hurled by magnetic attraction and repulsion through a tube exhausted of air, at a speed that would have made an old subway rider gasp with amazement.

In five more minutes their car had whipped up to the base of another building, in the business section, where there was no room for parks between the mighty structures that held the unbrok-

en glass roofs two hundred stories above the concrete pavement.

An elevator brought them up a hundred and fifty stories. Eric led Nada down a long, carpeted corridor to a wide glass door, which bore the words:

COSMIC EXPRESS

stenciled in gold capitals across it.

As they approached, a lean man, carrying a black bag, darted out of an elevator shaft opposite the door, ran across the corridor, and entered. They pushed in after him.

They were in a little room, cut in two by a high brass grill. In front of it was a long bench against the wall, that reminded one of the waiting room in an old railroad depot. In the grill was a little window, with a lazy, brown-eyed youth leaning on the shelf behind it. Beyond him was a great, glittering piece of mechanism, half hidden by the brass. A little door gave access to the machine from the space before the grill.

The thin man in black, whom Eric now recognized as a prominent French heart-specialist, was dancing before the window, waving his bag frantically, raving at the sleepy boy.

"Queek! I have tell you zee truth! I have zee most urgent necessity to go queekly. A patient I have in Paree, zat ees in zee most creetical condition!"

"Hold your horses just a minute, Mister. We got a client in the machine now. Russian diplomat from Moscow to Rio de Janeiro. . . . Two hundred seventy dollars and eighty cents, please. . . . Your turn next. Remember this is just an experimental service. Regular installations all over the world in a year. . . . Ready now. Come on in."

The youth took the money, pressed a button. The door sprang open in the grill, and the frantic physician leaped through it.

"Lie down on the crystal, face up," the young man ordered. "Hands at your sides, don't breathe. Ready!"

He manipulated his dials and switches, and pressed another button.

"Why, hello, Eric, old man!" he cried. "That's the lady you were telling me about? Congratulations!" A bell jangled before him on the panel. "Just a minute. I've got a call."

He punched the board again. Little bulbs lit and glowed for a second. The youth turned toward the half-hidden machine, spoke courteously.

"All right, madam. Walk out. Hope you found the transit pleasant."

"But my Violet! My precious Violet!" a shrill female voice

came from the machine. "Sir, what have you done with my darling Violet?"

"I'm sure I don't know, madam. You lost it off your hat?"

"None of your impertinence, sir! I want my dog."

"Ah, a dog. Must have jumped off the crystal. You can have him sent on for three hundred and—"

"Young man, if any harm comes to my Violet—I'll—I'll—I'll appeal to the Society for the Prevention of Cruelty to Animales!"

"Very good, madam. We appreciate your patronage."

THE DOOR flew open again. A very fat woman, puffing angrily, face highly colored, clothing shimmering with artificial gems, waddled pompously out of the door through which the frantic French doctor had so recently vanished. She rolled heavily across the room, and out into the corridor. Shrill words floated back:

"I'm going to see my lawyer! My precious Violet—"

The sallow youth winked. "And now what can I do for you, Eric?"

"We want to go to Venus, if that ray of yours can put us there."

"To Venus? Impossible. My orders are to use the Express merely between the sixteen designated stations, at New York, San Francisco, Tokyo, London, Paris—"

"See here, Charley," with a cautious glance toward the door, Eric held up the silver flask. "For old time's sake, and for this—"

The boy seemed dazed at sight of the bright flask. Then, with a single swift motion, he snatched it out of Eric's hand, and bent to conceal it below his instrument panel.

"Sure, old boy. I'd send you to heaven for that, if you'd give me the micrometer readings to set the ray with. But I tell you, this is dangerous. I've got a sort of television attachment, for focusing the ray. I can turn that on Venus—I've been amusing myself, watching the life there, already. Terrible place. Savage. I can pick a place on high land to set you down. But I can't be responsible for what happens afterward."

"Simple, primitive life is what we're looking for. And now what do I owe you—"

"Oh, that's all right. Between friends. Provided that stuff's genuine! Walk in and lie down on the crystal block. Hands at your sides. Don't move."

The little door had swung open again, and Eric led Nada through. They stepped into a little cell, completely surrounded with mirrors and vast prisms

and lenses and electron tubes. In the center was a slab of transparent crystal, eight feet square and two inches thick, with an intricate mass of machinery below it.

Eric helped Nada to a place on the crystal, lay down at her side.

"I think the Express Ray is focused just at the surface of the crystal, from below," he said. "It dissolves our substance, to be transmitted by the beam. It would look as if we were melting into the crystal."

"Ready," called the youth. "Think I've got it for you. Sort of a high island in the jungle. Nothing bad in sight now. But, I say—how're you coming back? I haven't got time to watch you."

"Go ahead. We aren't coming back."

"Gee! What is it? Elopement? I thought you were married already. Or is it business difficulties? The Bears did make an awful raid last night. But you better let me set you down in Hong Kong."

A bell jangled. "So long," the youth called.

Nada and Eric felt themselves enveloped in fire. Sheets of white flame seemed to lap up about them from the crystal block. Suddenly there was a sharp tingling sensation where they touched the polished surface. Then blackness, blankness.

THE next thing they knew, the fires were gone from about them. They were lying in something extremely soft and fluid; and warm rain was beating in their faces. Eric sat up, found himself in a mud-puddle. Beside him was Nada, opening her eyes and struggling up, her bright garments stained with black mud.

All about rose a thick jungle, dark and gloomy—and very wet. Palm-like, the gigantic trees were, or fern-like, flinging clouds of feathery green foliage high against a somber sky of unbroken gloom.

They stood up, triumphant.

"At last!" Nada cried. We're free! Free of that hateful old civilization! We're back to Nature!"

"Yes, we're on our feet now, not parasites on the machines."

"It's wonderful to have a fine, strong man like you to trust in, Eric. You're just like one of the heroes in your books!"

"You're the perfect companion, Nada. . . . But now we must be practical. We must build a fire, find weapons, set up a shelter of some kind. I guess it will be night, pretty soon. And Charley said something about savage animals he had seen in the television.

"We'll find a nice dry cave, and have a fire in front of the door. And skins of animals to

sleep on. And pottery vessels to cook in. And you will find seeds and grown grain."

"But first we must find a flint-bed. We need flint for tools, and to strike sparks to make a fire with. We will probably come across a chunk of virgin copper, too—it's found native."

Presently they set off through the jungle. The mud seemed to be very abundant, and of a most sticky consistence. They sank into it ankle deep at every step, and vast masses of it clung to their feet. A mile they struggled on, without finding where a provident nature had left them even a single fragment of quartz, to say nothing of a mass of pure copper.

"A darned shame," Eric grumbled, "to come forty million miles, and meet such a reception as this!"

Nada stopped. "Eric," she said, "I'm tired. And I don't believe there's any rock here, anyway. You'll have to use wooden tools, sharpened in the fire."

"Probably you're right. This soil seemed to be of alluvial origin. Shouldn't be surprised if the native rock is some hundreds of feet underground. Your idea is better."

"You can make a fire by rubbing sticks together, can't you?"

"It can be done, I'm sure. I've never tried it, myself. We need some dry sticks, first."

They resumed the weary march, with a good fraction of the new planet adhering to their feet. Rain was still falling from the dark heavens in a steady, warm downpour. Dry wood seemed scarce as the proverbial hen's teeth.

"You didn't bring any matches, dear?"

"Matches! Of course not! We're going back to Nature."

"I hope we get a fire pretty soon."

"If dry wood were gold dust, we couldn't buy a hot dog."

"Eric, that reminds me that I'm hungry."

He confessed to a few pangs of his own. They turned their attention to looking for banana trees, and coconut palms, but they did not seem to abound in the Venerian jungle. Even small animals that might have been slain with a broken branch had contrary ideas about the matter.

At last, from sheer weariness, they stopped, and gathered branches to make a sloping shelter by a vast fallen tree-trunk.

"This will keep out the rain—maybe—" Eric said hopefully. "And tomorrow, when it has quit raining—I'm sure we'll do better."

They crept in, as gloomy night fell without. They lay in each other's arms, the body warmth oddly comforting. Nada cried a little.

"Buck up," Eric advised her. "We're back to nature—where we've always wanted to be."

WITH the darkness, the temperature fell somewhat, and a high wind rose, whipping cold rain into the little shelter, and threatening to demolish it. Swarms of mosquito-like insects, seemingly not inconvenienced in the least by the inclement elements, swarmed about them in clouds.

Then came a sound from the dismal stormy night, a hoarse, bellowing roar, raucous, terrifying.

Nada clung against Eric. "What is it, dear?" she chattered.

"Must be a reptile. Dinosaur, or something of the sort. This world seems to be in about the same state as the earth when they flourished there. . . . But maybe it won't find us."

The roar was repeated, nearer. The earth trembled beneath a mighty tread.

"Eric," a thin voice trembled. "Don't you think—it might have been better— You know the old life was not so bad, after all."

"I was just thinking of our rooms, nice and warm and bright, with hot foods coming up the shaft whenever we pushed the button, and the gay crowds in the park, and my old typewriter."

"Eric?" she called softly.

"Yes, dear."

"Don't you wish—we had known better?"

"I do." If he winced at the "we" the girl did not notice.

The roaring outside was closer. And suddenly it was answered by another raucous bellow, at considerable distance, that echoed strangely through the forest. The tearful sounds were repeated, alternately. And always the more distant seemed nearer, until the two sounds were together.

And then an infernal din broke out in the darkness. Bellows. Screams Deafening shrieks. Mighty splashes, as if struggling Titans had upset oceans. Thunderous crashes, as if they were demolishing forests.

Eric and Nada clung to each other, in doubt whether to stay or to fly through the storm. Gradually the sound of the conflict came nearer, until the earth shook beneath them, and they were afraid to move.

Suddenly the great fallen tree against which they had erected the flimsy shelter was rolled back, evidently by a chance blow from the invisible monsters. The pitiful roof collapsed on the bedraggled humans. Nada burst into tears.

"Oh, if only—if only—"

SUDDENLY flame lapped up about them, the same white fire they had seen as they lay on the crystal block. Dizziness, insensibility overcame them. A few moments later, they were lying on the transparent table in the Cosmic Express office, with all those great mirrors and prisms and lenses about them.

A bustling, red-faced official appeared through the door in the grill, fairly bubbling apologies.

"So sorry—an accident—inconceivable. I can't see how he got it! We got you back as soon as we could find a focus. I sincerely hope you haven't been injured."

"Why—what—what—"

"Why I happened in, found our operator drunk. I've no idea where he got the stuff. He muttered something about Venus. I consulted the auto-register, and found two more passengers registered here than had been recorded at our other stations. I looked up the duplicate beam coordinates, and found that it had been set on Venus. I got men on the television at once, and we happened to find you.

"I can't imagine how it happened. I've had the fellow locked up, and the 'dry-laws' are on the job. I hope you won't hold us for excessive damages."

"No, I ask nothing except that you don't press charges against the boy. I don't want him to suffer for it in any way. My wife and I will be perfectly satisfied to get back to our apartment."

"I don't wonder. You look like you've been through—I don't know what. But I'll have you there in five minutes. My private car—"

* * *

Mr. Eric Stokes-Harding noted author of primitive life and love, ate a hearty meal with his pretty spouse, after they had washed off the grime of another planet. He spent the next twelve hours in bed.

At the end of the month he delivered his promised story to his publishers, a thrilling tale of a man marooned on Venus, with a beautiful girl. The hero made stone tools, erected a dwelling for himself and his mate, hunted food for her, defended her from the mammoth saurian monsters of the Venerian jungles.

The book was a huge success.

THE END

A Classic Reprint from AMAZING STORIES, January, 1930

the Hungry Guinea-Pig

By MILES J. BREUER, M.D.

Introduction by Sam Moskowitz

YOUNGER *readers are frequently puzzled to see the name of Miles J. Breuer, M.D. turn up in modern anthologies of science fiction as distinguished as* Fantasia Mathematica, *edited by Clifton Fadiman;* Science Fiction Galaxy *and* Big Book of Science Fiction *both edited by Groff Conklin. The name of David H. Keller, M.D. is still known but Miles J. Breuer, M.D., introduced to the readers of* AMAZING STORIES *the same year, 1928, is dissolving into undeserved obscurity. His novel* Paradise and Iron *which appeared in the Summer, 1930 issue of* AMAZING STORIES QUARTERLY *is perhaps the single greatest work on the perils to mankind of automation and thinking machines to appear in the science fiction magazines, yet, by some fluke, it has been overlooked as a candidate for book publication.*

Among his short stories there are certainly enough unusual ones to make a collection. His first, Appendix and the Spectacles *put his medical knowledge on display before the readers of the December, 1928* AMAZING STORIES *in a story based on operating through the fourth dimension so as to eliminate the necessity for an incision in the body wall. One of the earliest stories based on semantics, a theme which helped to make A. E. van Vogt's* World of Ā *so successful was Breuer's ingenious* Gostak and the Doshes *which appeared in* AMAZING STORIES *for March, 1930. In* The Fitzgerald Contraction *in* SCIENCE WONDER STORIES, *January, 1930, he may have been the first author to base a story on the now commonly accepted notion, confirmed by the time dilatation effect observed on mesons, that time passes slower for objects approaching the speed of light than it does for those stationary. Modern readers are familiar with the dramatic and poignant use of the theme made by L. Ron Hubbard in his near-classic* To the Stars, *which ran*

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From the flattened wreckage there gazed out at the rapidly growing crowd across the street, a pair of immense, pinkish brown eyes . . . set in a head that looked somewhat like that of an enormously magnified rabbit.

as a two-part novel beginning in ASTOUNDING SCIENCE-FICTION, *March, 1950.*

The Hungry Guinea Pig, *despite its early date of publication, is still a very novel departure from a theme that is particularly common in the motion pictures today: the giant creature that bulldozes its way through a modern city, toppling everything in its path. It began with* King Kong *and only a few of the more recent examples are* Godzilla, the Monster *and* The Beast From 20,000 Fathoms. *The preferred menace is usually a resurrected prehistoric beast; something inherently savage and destructive. In* The Hungry Guinea Pig, *Miles J. Breuer, M.D. shows that inborn viciousness is no prerequisite of danger in an oversized creature; that a gentle, timid animal, with no motive beyond satisfying its appetite, may bring as much devastation as the most evil denizen of the past yet conjured—and may be just as difficult to stop.*

A Chicagoan by birth, the late Miles J. Breuer, served in World War I as a medical officer in charge of fighting epidemics. He eventually set up practice in Lincoln, Nebraska as an internest, specializing in diagnosis and internal medicine. He maintained a massive personal research laboratory and contributed a substantial number of research papers concerning his specialty to the medical publications. Science fiction was a hobby that he particularly enjoyed, dividing his limited spare time between it and his other love, amateur photography.

DR. Clarence Hinkle walked reminiscently westward along Harrison Street. Things had changed. The city had grown.

"The spirit of Chicago is *growth,*" thought Dr. Hinkle.

Dr. Clarence Hinkle of Dorchester, Nebraska, was a country doctor of the modern, high-caliber type. He was thoroughly scientific in his methods and made use of all the facilities that modern science offers, in taking care of his prosperous farmer patients. He kept up with scientific progress by visiting conventions and taking post-graduate courses regularly. But this was the first time since his graduation that he had been back to Chicago and his Alma Mater. Now, after ten years of successful, satisfactory practice, he was on a pilgrimage back to old Rush. For study, yes; but also for a visit to the old places and to see old friends again.

He was especially anxious to see Parmenter. He and Parmenter had roomed together for four years, two on the South Side at

the University of Chicago, and two on the West Side at Rush, in the center of the greatest aggregation of medical colleges and hospitals within the area of a square mile known to the world. Parmenter had been brilliant and eccentric. As a student he had done astonishing things in biochemistry. He had made a wild and brilliant record in the war. Hinkle had kept up a desultory correspondence with him, which had conveyed hints of some research of Parmenter's; something amazing, but without details of information. Parmenter's work had so impressed the University of Chicago that they had built him a laboratory and dispensary to work in.

Dr. Hinkle walked up Harrison Street looking for it. The huge bulk of the Cook County Hospital loomed ahead of him. Thousands of Rush graduates all over America will appreciate how he felt when he saw the old corner at Harrison and Congress Streets, with the venerable and historic building gone, and a trim, business-like new one in its place. It seemed that sacred memories and irreplaceable traditions had been desecrated. But, progress must go on. However, the old "P. & S." was also replaced by a great maze of new buildings. And there ahead was a sign: THE PARMENTER INSTITUTE. So, they had even named the clinic after him! Indeed, he must have done something.

He stopped a moment to look the building over. Two trucks piled high with heads of cabbage drew up before the side entrance. The drivers conversed as they unloaded the cabbage.

"Yesterday," Dr. Hinkle overheard one of them say, "I delivered a load of freshly cut alfalfa here. You'd think they had a lot of big animals. Funny thing for this part of town. And tomorrow we'll be bringing more stuff; wait and see."

They carried basketloads of cabbage-heads up the short flight of stairs, and the porter of the building always opened the door and took the baskets from them.

"Listen!" whispered one of the truck-drivers to the porter, catching him confidentially by the shoulder; "what's all these loads of green stuff for?"

"For feeding our experimental animals," replied the porter haughtily, as though he knew things they were not competent to understand.

"What sort of animals?" asked the truck-driver, looking doubtfully at the building, whose windows were the same as those of the others with their small rooms.

"Guinea-pigs," replied the porter.

"Guinea-pigs," The truck-drivers looked blankly at each

other. "What are guinea-pigs?"

"Hm!" snorted the porter contemptuously. "Don't know what guinea-pigs are!" He saw them every day. "A guinea-pig is an animal like a rabbit; no, smaller —half as big. It looks something like a rabbit and something like a rat."

"Aw!" growled the truck-driver. "He stringin' us."

"No," replied his companion. "That's true. I saw them when I was in the hospital. The doctors use them for speerments."

An inner door opened and a white-clad attendant stood looking out of it into the hall. For a while, as the door stood open, they heard a number of short, low-pitched, whistle-like notes. Then another hand slammed the door shut, and again the hall was dark and silent. To Dr. Hinkle's mind, the sound had no resemblance whatever to the squealing of guinea-pigs. The truck-drivers continued to carry cabbage and to tarry inquisitively.

Dr. Hinkle walked briskly up the front steps of the Institute, and into the office. He handed his card to the girl at the information desk, stating that he had an appointment with Dr. Parmenter.

"The doctor said you were to come into the office and wait for him," she said, showing him into an adjoining room.

IN Parmenter's office, a large desk was piled high with neatly arranged stacks of books, papers, and chemicals, covered almost all the wall space, except where it was occupied by a great steel safe. Since there was also a safe in the business office through which he had passed, Dr. Hinkle concluded that this one held, not money, but, rather, records of tremendous importance, or some sort of chemical preparation that might be dangerous in the hands of the wrong people. He sat down and waited, his eyes flitting back and forth among the titles of the medical, chemical, and biological publications.

As he sat in his chair, he could see through the open door down a long hallway. At the end of the hallway was another door; a curious door that seemed to be made of heavy planks placed horizontally, and held together with iron straps. This door was slowly pushed open, an interne emerged into the hallway, and with considerable effort tugged the door shut again and turned a heavy bolt. While it was open, Dr. Hinkle heard several more of those short, reverberating, fluty notes, like the low pipes of an organ. They were accompanied by heavy, dragging sounds, as of something tremendously heavy scraping on the door with little short scrapes. Another interne

came down the hall, and as the two met, the first one said:

"This can't go on much longer. It's got to be stopped."

The second one laughed a harsh, mirthless laugh.

"I guess we'd have stopped it already, if somebody would tell us how."

The two went back through the heavy door. Dr. Hinkle craned his neck to get a glimpse through it. In the vast half-gloom through the door, he caught a fleeting glance at a huge curved back and flanks, covered with long, straight brown hair.

"A cow? Or a bear?" he wondered in astonishment. "It's bigger than a couple of both. What in—"

Dr. Parmenter walked briskly out of a door down the hall, and seeing Hinkle in his room, hastened in. Dr. Parmenter had a worried look about him; a wrinkle in his forehead that he couldn't seem to smooth out, a wrinkle that betrayed some sort of preying anxiety. He looked much older than his country confrére, though the quondam roommates were really almost of an age. They stared wildly at each other, each surprised at the changes in the other. They gripped hands in silence for some minutes.

"Well, so this is what you're up to!" Hinkle exclaimed.

"You look like a million dollars!" Parmenter congratulated.

They sat and chatted small stuff for a while.

"You do look prosperous," Parmenter insisted. "You must be doing well."

"Oh, I've put aside a few thousand. Ten more years like these, and I could retire in modest independence."

Parmenter sighed.

"I can't seem to get ahead much financially." He paused wistfully. "You have a family?"

Hinkle nodded.

"Two boys and a girl."

"Happy dog." Parmenter had a far-away look in his eyes.

Hinkle was also looking a little thoughtful.

"The medical drudge, the traveler over country roads, the custodian of colds and stomachaches wishes to inquire," he said earnestly, "if there is not happiness in being known all over North America; in having papers published in every scientific journal; in being invited to great conventions as an honored guest; in having a dispensary built for you and called after you—a young fellow like you? You make me feel like a moron."

Parmenter's face warmed up a little with pride.

"And a colonel during the war!" Hinkle continued. "Do you know, I'm famous back home among the common folks just because I can say I used to room with you?"

Parmenter was silent but grateful. Finally he said:

"So you got into the fracas in France too? How did you go?"

"Oh," replied Hinkle, as though he disliked to admit it, "plodding along in a field-hospital unit. But you—" his voice rose in surprise again—"a medical man! How did you happen to go as an artillery officer. I'd think you'd want to give your country the benefit of your scientific training."

PARMENTER sat straight up in his chair. His face livened up with interest.

"Scientific training!" he exclaimed. "Maybe you think you don't need scientific training in the artillery. I dare say I made better use of what scientific ability I may have, in the artillery than I ever could have done as a mere medical officer. Wasn't it so in this war, that only one medical, officer out of a thousand had any opportunity to do scientific work? The scientific training I got in the artillery corps has helped me to accomplish what I've done since the war."

Hinkle stared incredulously.

"If you don't think it takes *science,*" Parmenter said, "to yank a four-ton gun into place in the middle of a field, and put a shell on a spot the size of a door ten miles away at the third shot —you've got another guess coming. That takes real figuring, and real accuracy in working. To come up into position one night, and by the next night to have the country for twenty miles ahead plotted into numbered squares, into any one of which you can drop a shell instantly, within ten seconds of a signal from an airplane observer—the whole medical department didn't use as much science as did our little battery of heavy field artillery. That was a glorious kick-up—"

He stopped and turned his head, as several fluty whistles came faintly from within the building.

"But this is just as exciting," he continued when the errie sound had ceased. He smiled at Hinkle's look of amazed inquiry.

"I guess I'd better show you around," he said. "I've got something here that hasn't been published yet."

"I got a peek at some ungodly thing a while ago," Hinkle remarked; "What is it—a buffalo? No; it's three times as big. A dinosaur? I never heard of any animal that would fit what I saw. Is that what makes the tooting?"

Parmenter stood enjoying his friend's amazement.

"Perhaps I'd better prepare you for the sight first. I can explain briefly in a few moments. A few years ago I got interested in ductless glands and internal

secretions, and my interest eventually narrowed down to two of them about which the least is definitely known; the pituitary and the pineal bodies. I've done a lot of work on these two little brain-glands and written a lot about them. Both of them are intimately concerned in body growth. You will recollect that in the pathological condition known as *acromegaly*, in which there is an excess of pituitary secretion supplied to the body, the limbs grow long, and tall giants are produced; and you know how stunted the individual remains in cases where the pituitary body fails to secrete adequately. Perhaps you have also followed McCord's experiments: he fed chicks with pineal glands from cattle, and they grew to three or four times the size of normal birds. Then, a couple of workers in California separated from the pituitary body a substance which they callel *tethelin*, and which when injected into mice, doubled their growth.

"I repeated and confirmed their work, and made large quantities of *tethelin*. The fact impressed me that neither the pineal experiments alone nor the pituitary experiments alone produced a well-balanced increase in size of the experimental animals. I obtained the active principle of the pineal body, which I took the liberty of naming *physein;* I got it by four-day extraction with ether in the Soxhlet apparatus and recrystallization from acetone. Man, you should have seen the baskets and baskets of pituitaries and pineals from the stockyards, and all the ether and acetone we sp'ashed. But, after all the dirty work, the half dozen bottles of gray powder that we got gave us a lot of satisfaction.

"Of course we injected the stuff into guinea-pigs. The guinea-pig is always the victim. At first we used six; and six controls which received none of the *tethelin-physein* solution. But we soon discarded the controls, for the injected animals grew like the rising of the mercury in a thermometer. They grew so fast that we had to kill five of them when they were as big as dogs, for fear that we could not feed them. This one we kept in order to ascertain the limit of size to which it would grow. Now we have had it six months, and it is as big as—well, you'll see. It is becoming difficult to feed, and it's a rough clumsy beast. I'd get rid of it, if I knew how—"

He was interrupted by a terrific hubbub from within the building. The whole structure shook, and there was a vast ripping, tearing. Crash after crash rent the air, followed by hollow rumbles and reverberations.

Dr. Parmenter dashed to the door and looked down the hall-

way. There were great cracks in the plaster, and chunks of the ceiling were raining down to the floor. The door at the end of the hall hung loose, revealing beyond it, not the semi-gloom of a big room, but the bright daylight of outdoors; just as though a piece of the building had been torn off. A huge rattling, banging din was going on, with clouds of dust filling the air.

He started down the hall, but a shower of bricks and plaster through the wrecked doorway deterred him. Seizing Dr. Hinkle's arm, he dashed out to the street, dragging the latter with him. Hinkle was puzzled; Parmenter was pale and looked scared, but seemed to know what was going on.

OUT in the street, people stood struck motionless in the midst of their busy traffic. Fascinated, like a bird watching a serpent, they stood glued to the ground, their eyes turned toward the Institute. A moment ago the business of Harrison Street had been going monotonously along, just as it had gone for a couple of score of years. Suddenly two or three people had stopped. Some sort of queer things had appeared in a window of the Institute, horrible looking objects, as though a monkey had jumped up on the sill. But no, the pink things were not arms and legs; each had a single huge claw at the end of it. The whole thing looked like an enormous rat's paw. The group of astonished people standing and staring at it increased momentarily.

Then the brick wall bulged outwards, and a section of it as big as a room fell out of the ground in a mass of debris. A vast brown back appeared in the opening, and the thing's clumsy scratching threw layers of brick wall across the street. The enormous animal rolled out and disappeared behind the three-story signboards in the adjoining empty lot.

Dr. Hinkle and Dr. Parmenter ran across the street to watch. There was a huge commotion behind the signboards; then with a crashing of breaking wood the whole structure of signboards went over. There were screams of people on the sidewalk who were caught beneath the falling mass, and the tinkle of glass from smashed automobile windshields. From over the flattened wreckage there gazed out at the rapidly growing crowd across the street a pair of immense, pinkish-brown eyes. They were set in a head that looked somewhat like that of an enormously magnified rabbit, though it was held down close to the ground. Behind it arched a great brown back, higher than the second-story windows, covered with

long, straight brown hair, with black and white stripes and spots.

The creature looked around, jerking its head first one way and then another, apparently very much frightened. Then it moved forward a step to the accompaniment of crackling timber. The crowd surged away, and disappeared frantically into buildings and around blocks, as the animal slowly started toward it. Dr. Hinkle felt a sinking sensation within him as he realized that there were injured people on the sidewalk under that mass of wreckage that crunched and crumpled under the animal's huge weight. Everywhere, windows were filled with heads. In the Institute, the undamaged windows contained white-clad doctors and nurses. In the next block, an elevated train passed with a hollow, rumbling roar, and the giant guinea-pig crouched down and trembled in fear.

Then it ran out into the street with short, quick steps. One could get some idea of its size from the reports of the spectators, who stated that there was barely room in the street for it to turn around in. It had started across the street, and in its efforts to get loose it caught the odor of some scraps left behind at the unloading of the cabbage trucks, for it suddenly began to turn around. Its paw caught in the window of a flat across the street, and in its efforts to get loose it wrecked a side of the building. Beds, refrigerators, and gas-stoves hung out in the open air. The animal seemed very much frightened.

Dr. Hinkle and Dr. Parmenter had been carried by the crowd to the solid shelter of the Cook County receiving-ward. People began to sense that the thing was dangerous, and scattered precipitately away from the scene of excitement. An Italian fruit vendor was pushing his cart westward along Harrison Street. The animal smelled the fruit and immediately became very much excited. It turned this way and that, but always there were buildings in its way. Finally it stepped up on the roof of a two-story flat on the corner. The roof caved in, and the screams of women were heard from within. In its effort to extricate itself, it made a wreck of the building. Then it hastened down a cross street in pursuit of the fruit cart.

The Italian heard its approach and stopped; he stood paralyzed by fear. The guinea-pig never saw him at all; it leaped for the fruit and one accidental blow of its paw knocked him over and crushed him flat. Only a bloody, smeary, shapeless mass on the street remained to tell the tale. Parmenter, already pale and

trembling, shrank back as the Italian screamed and raised his hands above his head, carried down by the giant paw. Parmenter's eyes had a cowed, beaten look in them.

THE fruit on the cart made a scant mouthful for the guinea-pig. It chewed very rapidly, with a side-to-side movement of its jaw. When it raised its head, its bare lower lip was visible, pale pink, and below it a group of short, white whiskers. The grinding of its teeth was audible for a block. Another train thundered along on the elevated railway, its windows crowded with curious heads. The guinea-pig became frightened again, and ran swiftly westward along Harrison Street. As it ran, its feet moved swiftly beneath it, while its body was carried along smoothly rocking, as though it were on wheels. It ran very swiftly, more swiftly than the automobiles that tried to get away from it; and the people along the street had no time to get out of the way. First a child on a tricycle was swept away, and then two high-school girls disappeared under it; and when it had passed, it left behind dark smudges, as when an automobile runs over a bird. It ran three blocks west, eating up all the potatoes and vegetables, baskets and all, in front of a grocery store, and then turned north. Hinkle and Parmenter lost sight of it, noting a car filled with armed policemen in pursuit of it.

Parmenter's nerves were indeed shaken. He stared straight ahead of him and walked along like a blind man. Hinkle had to guide him and take care of him as though he were an invalid. Parmenter felt himself a murderer. All of these deaths were his fault, due directly to his efforts. Despite the fact that he was half paralyzed with remorse, he persisted in trying to follow the animal with a desperate anxiety, as though in hopes that he could yet do something to right the wrong. For a while he led Hinkle around aimlessly.

Then they heard the sound of the firing of guns, and breaking into a run, came around the block into Jefferson Square, a small, green park a couple of blocks area. There the guinea-pig was eating the shrubbery, tearing up great bundles of it with its sharp teeth. It smelled hungrily at the green grass, but was unable to get hold of the short growth with its large teeth. The bandstand and the bridge across the pond were wrecked to fragments. The police were shooting at the animal till it sounded like a battle, but it was without effect. Either its hide was so thick that the bullets did not penetrate, or else the mass of

bullets was so small that they sank into its tissues to no purpose. Once they must have struck it in a sensitive spot, for it suddenly scratched itself with a hind leg, and then went on chewing shrubbery. The police crept up closer and kept on firing; then all of a sudden the guinea-pig turned around and sped up the street like lightning. Before the police recollected themselves, it was out of sight, and the street presented a vista of overturned Fords, smashed trucks, a street-car off the rails and crowded against a building, and tangled masses of bloody clothes. A trolley-wire was emitting a string of sparks as it hung broken on the ground, and a fountain of water was hurtling out of a broken fire-plug. The animal disappeared to the north; the two medical men sought it for a while and finally gave it up.

Dr. Hinkle decided that he must get his friend somewhere indoors. They succeeded in finding a taxi in the panic, and drove to Parmenter's apartment. Hinkle had to support Parmenter and put him to bed. Parmenter would not eat. He continued to groan in incoherent misery. Hinkle went out and got some evening papers. The headlines shrieked.

"Monster Devastates West Side!" "Mysterious Animal Spreads Terror!" and so forth in their inimitable style. The reports said it was a fearful bear, bigger than an elephant or a freight engine, or that it was a prehistoric saurian miraculously come to life. They stated that it hunted people as a cat hunts mice, and that it had eaten great numbers of them, and in its savage rage had smashed buildings and vehicles. Gun fire had no effect on it, and it had in fact devoured a squad of policemen who had been sent out to kill it.

Parmenter sat up when Hinkle read some of the reports.

"The poor idiots!" He exclaimed in sudden and composed wrath. The grossly exaggerated reports seemed to have the effect of pulling him together.

"Newspapers act like a bunch of scared hens," he said contemptuously. "They're starting real, insane panic, that's all. What do you think, Hinkle: is that guinea-pig going about deliberately killing people? Is it wrecking the town out of pure spite?"

"It is quite evident," Hinkle said, "that the guinea-pig is far more frightened than the people are. The deaths are mere accidents due to its clumsiness—"

"Yes," reflected Parmenter sadly. "A guinea-pig has about as little brains as any animal I could have picked out. If it had been a dog, it could be careful."

"And the thing seems to be

hungry," Hinkle continued. "Hunger seems to be the main cause of its destructive proclivities. It is hungry and is hunting around for food. And food is hard to find in this little ant-heap."

Hinkle was correct. The whole subsequent history of the huge animal's wanderings around the city represented merely a hunt for food, and possibly a place to hide. It is doubtful if its hunger was ever satisfied, despite the vast amount of foodstuffs that it found and consumed. Certainly it paid no attention to people. The wrecking of the Lake Street Elevated Station was probably due to its efforts to find shelter. In the evening the guinea-pig tried to burrow under the station and hide. The space underneath the station was too small and the steel beams too strong; and it gave up and turned away, but not until it had so bent and dislocated the steel structure that the station was a wreck and train service was interrupted. The last report of the night located it on West Washington Street. People were afraid to go to bed.

In the morning Hinkle dashed out after newspapers. The editorials corrected some of the previous day's errors about the ferocity of the giant guinea-pig, and called attention to the fact that it had definitely increased in size during its sixteen hours of liberty.

"If it keeps on growing bigger—?" the editor suggested, and left it as a rhetorical question.

The news items stated that during the night the guinea-pig had located the vegetable market on Randolph Street, for many buildings were wrecked and their contents had vanished. The Rush Street bridge was smashed, as were the buildings at the edge of the water. And the city was beginning to go into a panic; for no efforts to stop the animal had as yet been of any avail.

THE evening papers of the second day brought a new shock. Hinkle had spent the day following Parmenter about. The latter dashed this way and that, in taxicabs, surface-cars, buses, and elevated trains, in frantic efforts to catch up with the animal. They did not catch sight of it all day. They arrived in Parmenter's apartment in the evening, dead tired. Parmenter was in the depths of depression. Hinkle opened a bundle of newspapers they had not had time to read.

"LAWYER'S WIDOW SUES SCIENTIST!" announced the headlines; "Mrs. Morris Koren Files Claim for Damages Against Professor Parmenter for Husband's Death. One hundred thousand dollars is demanded by the widow of the

prominent attorney who was crushed in his automobile by the huge guinea-pig yesterday. The plaintiff is in possession of a clear and complete chain of proofs to establish her claim —"

Parmenter sat silent and wild-eyed. Hinkle clenched his fists and swore. He thought Parmenter was suffering enough with all these deaths on his conscience. Now, to have added to it a lawsuit with its publicity, and the almost certain loss of the property he had accumulated, and the complete wrecking of his career! Parmenter gazed now this way, now that, and sat for a while with bowed head. He rose and walked back and forth. He sat down again. He said not a word. Hinkle sat and watched his friend's sufferings with a sympathy that was none the less genuine for being speechless. Before him was a broken man, in the depths of disappointment and despair. All his life Parmenter had been working, not for his own interests, but for the good of mankind. To have the people to whom he had freely given of his life and work turn against him in this unkind way was something he could neither grasp nor endure. Hinkle never saw a man change so completely in twenty-four hours.

A later edition carried the announcement of another lawsuit against Parmenter. The Chicago Wholesale Market claimed $100,000 damages for the destruction of their buildings and merchandise stock. Their evidence was also complete and flawless.

By morning, Parmenter's depression was gone. He was pale, but calm and deliberate. His lips were set in a thin line, and the angles of his jaws stood out with set muscles. He had shaken off his nervousness and a steady light shone in his eyes. His keen brain was at work as of old. Hinkle understood; no words were needed. They had been roommates for four years and knew each other's moods. Hinkle gripped his friend's hand and put his left on Parmenter's shoulder. As eloquently as though he had said it in words, he was expressing his sympathy and his joy because his friend had found his strength again and in spite of his troubles. Troubles indeed, for the loss of life was already beyond estimate; and complete ruin for Parmenter was a certainty.

"Got to find some way of stopping the beast," Parmenter said succinctly.

"If it can be done, I know you'll do it," Hinkle replied. "Only tell me what I can do to help you."

"Stick around," said Parmenter. "That'll help." They understood each other.

Hinkle could not help admir-

ing the sheer will-power of the man. Newsboys went bawling by the window. The morning papers announced a fresh string of lawsuits, claiming a total of damages of nearly a million dollars. Parmenter paid no attention. He nodded his head and went on making notes with his pencil on the back of an envelope. He had made up his mind, and news had no further effect on him. Only once he took Hinkle's breath away with a dispassionate, impersonal reflection:

"The civil damage suits will break down of their own weight. The matter has already gone so far that it is ridiculous. It won't pay any of them to spend any money bringing it into court. But, suppose it develops into criminal proceedings?

"Well, that's all I have to expect. Science does a lot of good. But sometimes it miscalculates and does harm. Under the laws of Nature, miscalculators pay the penalty of elimination."

Parmenter sat motionless most of the day. He moved once to eat mechanically, and once to receive reports by telephone from the Institute. His mind was busy, as usual.

The evening papers brought reports that the guinea-pig had gotten tangled up in a trolley-wire and received an electric shock which had sent it scuttling to the Lake. The wire dropped to the ground, interrupting the street-car service of that part of the city. The guinea-pig ran straight to the water. There it again smelled green forage and ran northward along Lake Shore Drive. In an hour it had devastated all the trees and shrubbery, and eaten up everything green in sight. Because it spent more time at this place, the police detachments caught up with it, and were again vainly pouring bullets at it. Again something startled it, and it ran off westward. It ran so swiftly that it was out of their sight in a few moments. For the greater part of two days they pursued it about the city in this manner, and the tale thereof is largely a repetition of what has already been said.

Parmenter hit his knee with his fist.

"We've got to stop the brute somehow, or there won't be any Chicago left. Who would have thought that a brainless, clumsy, stupid thing would have the whole city at its mercy?"

HINKLE was turning over the pages of the newspaper, scanning the editorials that were already predicting what Parmenter had foreseen, the breakdown of the damage suits. The editor stated confidently that they would never get into court

"Better get a lawyer anyway," Hinkle suggested.

"I won't need one." Parmenter's face brightened. Did he have an idea?

There was no time to ask. A strange murmur had arisen outdoors. A rushing, rustling hum, like that of a flowing river, came from the distance. Now and then shouts rose out of the confusion. Hinkle went to the window, full of curiosity at the city's manifold noises.

He stopped for a moment. He also had a quick brain, and in an instant the meaning of it flashed through his mind. He dashed back and caught Parmenter by the arm. With hats and coats in the other hand, he dragged Parmenter toward the back of the house.

"What's up now?" Parmenter demanded out of the depths of his preoccupation.

"A wild, raging mob!" Hinkle shouted. "The people are dancing with ferocity like a bunch of savages on the warpath. I saw clubs and guns. They probably found that there was no redress in lawsuits, and are coming after you to settle it themselves."

Parmenter still dragged back, reluctant to follow Hinkle.

"I don't care to escape," he protested. "What is the use of life in a world where there are people like that?"

Hinkle stopped a moment.

"You seem to have struck some idea for helping this city," he said sternly. "Do you want them to lay you out before you can rectify this blunder of yours?"

They were blunt, cruel words, but they worked. Parmenter straightened up.

"You're right. I've got a scheme that will work. Come on!"

They hurried through the house toward the rear door. There they stopped. There was a mob in the alley; its fierce yells greeted them as they opened the door. They shut it again and went back in.

"Now what?" asked Hinkle. It looked hopeless. The mob was closing in on all sides of the house. Parmenter stood for a moment. There was a pounding on the front stairs of numberless feet. He hurried to the front door, pulling Hinkle with him; and the two stood so that they would be behind it as it opened. The mob raged and yelled outside and blows thundered on the door.

"They don't know us from John Smith," Parmenter whispered. "Put on your hat and coat."

His plan worked perfectly. The door burst in; its fragments swung on the hinges and splinters fell over the carpet and were trampled by a dozen yelling men, who plunged violently half way down the hall at one jump. In a moment the place was crowded. Parmenter and Hinkle waved

their arms and yelled and mixed with them. No one in the mob knew what was going on anywhere except immediately about him.

They were carried on into the rooms by pressure from behind; the surge of them met the mob coming from the rear door. In a few minutes the fugitives had crowded their way out of the door and into the street. For a few moments and from a safe distance they watched the flames and the firemen. There must have been deaths in that mad stampede. Then they crept off to a downtown hotel and registered under assumed names.

Parmenter sat on the bed.

"You'd like to hear my idea?" he suggested, as though nothing had happened. Hinkle nodded his head because he was too much out of breath to speak.

"SIMPLE," Parmenter said ironically. "The human mind is a rudimentary mechanism. To think that it took me—*me*, three days to think of it. It is so simple that I'm afraid to spring it at once for fear there is some flaw in it. Let me take you through the line of reasoning by which I arrived at it, clumsily, blunderingly, whereas it ought to have been a brilliant flash through mine or somebody's else's brain."

He lay back relaxed on the bed, his hand over his eyes, and talked.

"I wish to analyze the situation thoroughly; on the one hand to make sure that we are not passing up some good method just because nobody has thought of it.

"To stop this destruction of life and property, we've either got to *catch* the animal or *kill* it. There is no alternative, no third possibility. Is there?"

"No. Plain enough."

"They've tried to catch it. It went through the elephant chains of their trap there. Steel columns of the Elevated bend and snap under its weight. It would require weeks of special work to put together something that would really hold it. Our best bet is to kill it. Is that correct so far?"

"O. K."

"Now what are the possible methods of killing?" He held up an envelope on which he had arranged in a column:

Poison
Disease (infection)
Starvation
Trauma (violence)

"Is there anything else?" he asked.

Hinkle thought a while and shook his head.

"These are the only known causes of death, except old age. Now, some we recognize promptly as obviously out of question;

for instance starvation. If we wait for that, we'll starve first. Consider disease. The only available method of producing a lethal disease, is by inoculating with some infection which works swiftly. But, if we do that, we are running the risk of its spreading its infection to the people of the city; the spread of infection might do more harm than the guinea-pig is doing. Perhaps that might be considered as a hope if there wasn't something better. Now, poison—"

"It looks as though poison were your real hope," Hinkle agreed.

"Yes. *Looks* like it. The police thought so too. They've tried poison-coated bullets, and the pig is still here. They've laid poison bait for it—"

"Do you think that the guinea-pig has developed some sort of an immunity against poison?" Hinkle was genuinely puzzled.

"Simpler than that. There is a quantitative relationship. It takes a definite amount of poison to be fatal. Consider strychnine for example. If you remember that it takes 1/1000 of a grain of strychnine per pound of body weight to kill; and suppose the beast only weighed a ton or two, you'd have to have a pound of strychnine, and how are you going to administer it?"

Hinkle sat and looked blank.

"Never thought of that," was his comment.

"Violence. Trauma. That's all that's left to us," Parmenter concluded.

"And that's out of the question," Hinkle said hopelessly. "How are you going to injure that thing?"

"To think that it's taken me three days to get the idea!" snorted Parmenter contemptuously. "If someone tried to sell you a machine as inefficient as the human brain, you'd throw it back at him.

"Trauma! Didn't I spend two years doing exactly that in France?"

Hinkle leaped to his feet.

"Artillery!" he gasped.

Parmenter nodded.

Hinkle sat down again, the hopeful look gone out of his face.

"No use," he said. "You'll do more harm to the city with the shells than to the guinea-pig."

"Say!" There was a sarcastic note in Parmenter's voice. "Do I have to tell you again that ballistics is a science? But, enough now. We'll get to work and do the arguing later."

Parmenter became a thing of intense activity. He sat at the telephone, called numbers, asked questions, gave orders, with the rapidity of a machine-gun. He seemed perfectly at home in it; obviously he had done it before. From the obscure hotel room he directed a miniature war. Here is

some of the one-sided conversation that Hinkle heard:

"Alderman Murtha? This is Parmenter. I've worked out a plan to kill it. Authority to go ahead. Want me to explain it? All right, thanks for your confidence. We'll have it as soon as there is daylight enough to see by."

Another number:

"City engineer's office? Calling by authority of the police department. We want scale landscape maps of all the parks and plat maps of all the country from here to Clark Junction. Deliver them at once to the Fort Dearborn Hotel."

"Is this the Chief of Police? Has Alderman Murtha called you about giving me authority—? All right, thanks. Where is the animal now? South Side? Listen. Order a dozen truckloads of green stuff, cabbage, alfalfa, anything, dumped in the empty space in Jackson Park where the baseball diamonds are. Have it arrive there shortly before dawn, all piled on one big heap. Then lay a trail of the green stuff on in the direction in which the guinea-pig is at the time.

"And don't forget to keep your men away from that pile of greens!"

HE barked the last words out viciously. Then he called long-distance. He placed several calls, asking for Colonel Hahn. Finally the Colonel answered. Parmenter talked:

"You know of our misfortune here in Chicago—that's true, but we have just now thought of it. What's the biggest field gun you can rush over here? Right now, this minute. Yes, 150's will do the business. Two batteries. At Clark Junction. A few shells nothing! We want a five-minute barrage to cover an acre! Somewhere around dawn. You're a gentleman and a soldier. A credit to the service, sir!

"Mayor Johnson has telegraphed to the Secretary of War and the authority will come through promptly. I have maps ready for you; send a plane to the Cicero landing-field, and I'll meet it there. And two airplane observers."

He turned to Hinkle.

"Now do you get the idea?"

Hinkle slapped him on the back.

"A 150 millimeter barrage on the brute! That ought to fix him."

"Grind him up to Hamburger steak," Parmenter said grimly.

"But how will you keep from wrecking the town?"

Parmenter made a gesture of impatience.

"Not a building will be injured. The pig will be decoyed to a clear space in the park—"

"Yes, I got that idea."

"The area of dispersion for a 150-millimeter gun is about a hundred yards. That means the first shot will hit within a hundred yards of the target. They will first send over a few dummy shells, and the hits will be reported by airplane observers so that they can correct their range and angle."

"Looks dangerous anyway," Hinkle said thoughtfully. "I'm going to Milwaukee till it's over."

Of course he was not afraid. He was merely trying to carry off the situation lightly in order to encourage Parmenter. He followed Parmenter anxiously. There was little conversation during the two-hour ride to the landing-field. Three military planes were already waiting there. There was a swift conference over open maps and a few minutes' drill on signals, whereupon one plane rose and sailed away into the night, bearing the maps with it to the position of the gunners. Parmenter looked after them longingly.

"It gets into your bones," he observed. "I could hardly keep myself from climbing in with him. Just think! Four miles away the huge field guns are clanking into position; motors are roaring and the line is swinging round; men are toiling in the dark. By morning there will be a semicircle of Uncle Sam's prettiest rifles pointed this way. But, we'll forget it and hunt for a telephone."

A telephone was not easy to find in Cicero at one o'clock in the morning. They finally located one in the "L" station. Parmenter called the Chief of Police.

"Where's the thing now?" he asked. "Fine. All arrangements made? Coming?"

Parmenter's eyes blazed. Again he was an artillery officer.

"Jackson Park," he said to Hinkle.

THERE were long waits for cars at night; a change from the elevated to the surface cars; a piece in a taxi, and the elevated again. Dawn was breaking gray over the lagoon when they arrived at Jackson Park. Parmenter raced with feverish haste to the flat, empty space where a score of baseball diamonds had been laid out for the use of the public. A string of half a dozen huge trucks was thundering away from the spot. Two loaded ones were proceeding slowly; men were throwing out a trail of cabbage and alfalfa bales behind them. In the middle of the open space was a heap of green stuff, big as a huge straw-stack.

Daylight was breaking rapidly. A bright orange blotch appeared out in the Lake; glorious streaks of crimson shot through the blues and grays of the water and sky; soon a glowing ball

hung in a purple setting. For an instant the two medical men irresistibly admired the splendid spectacle of the sunrise. But in a moment they were interrupted by the noise of a couple of airplanes coming down in the open field. The pilots stepped out, pushing their goggles up over their helmets. Two motorcycle police came down the driveway.

The two aviators unconsciously saluted Parmenter, and then grinned sheepishly, because he was not in uniform. He looked so much a soldier that their action had been a natural one.

Parmenter gave orders for one plane to taxi across the field out of the way, and remain on the ground in reserve, while the other was to rise and remain in the air to direct the fire. The two motorcycle men were to locate the guinea-pig, and guide the bait truck toward it; and as soon as it had picked up the trail, to hurry back and notify him, here at the park.

When the two motorcycles disappeared, Parmenter and Hinkle waited in nervous impatience. They walked much and talked little. The yellow of the sunbeams grew brighter, and it seemed an age before a motorcycle finally sputtered up to them.

"The pig is coming!" shouted the driver from a distance.

Parmenter threw a smoke bomb; the puff of a yellow smoke was a signal of the airplane observer, who, by means of his radio, notified the gunners to get ready.

"Poor pig!" thought Hinkle to himself. "The city and its police, the United States Army, motorcycles, trucks, airplanes, 150-millimeter guns, all mobilized against a poor, lost, hungry guinea-pig!"

The motorcycle men stepped out long enough to tell them that the guinea-pig was near Washington Park; it had sniffed a truckful of fresh alfalfa and had whirled around to seize it. The truck was demolished and the driver had not yet been recovered from the debris. Parmenter turned a shade paler and set his teeth more firmly. The guinea-pig was now following along the trail of alfalfa and cabbage that led directly to our heap in the park. Parmenter was silent as the motorcycle whirled around and dashed up the road.

A whining scream came from high in the air; there was a great splash on the beach, which threw up sand and water, left a puff of smoke behind it. The airplane was circling around in a figure "8" between the Lake and the pile of greens. Another scream and a crash in the shrubbery, not twenty yards from the pile of greens. A third heavy thud scattered the edge of the pile of green stuff.

"Good boys!" Parmenter breathed proudly. "They can still shoot."

Hinkle admitted that it was wonderful: the guns at Clark Junction four miles away, the airplane doing figure "8's," and a shot right at the edge of the pile. A fourth shot came over, and scattered the nice heap of greens all over, spread it flat on the ground. Although the shell had been a dummy and had not exploded, nevertheless the impact of it, squarely in the middle, had scattered the cabbage and alfalfa far and wide.

"Damn!" Parmenter was annoyed. No wonder. With the greens spread over an acre, how could the guinea-pig be located accurately enough to concentrate the fire properly. Someone had missed that point in the plans. They ought to have omitted that last shot.

Parmenter was swearing and shaking his fists. He started toward the scattered pile of greens on a run. Hinkle gazed dumbfounded, as he began with demoniac strength to toss bales of alfalfa and heaps of cabbage back on the stack. He started over to help.

Suddenly, when Hinkle got near enough to be within earshot Parmenter whirled around, with a terrible, savage expression on his face.

"Back! Go back!" he roared.

The fierceness in his tone stopped Hinkle. He stood and stared.

"Go!" shouted Parmenter in an agonized snarl. "Go, damn you! Quick!"

Hinkle was too amazed to move.

"I wanted to help you pile it up—" he faltered.

Parmenter drew a pistol from his pocket, a huge forty-five caliber Army automatic, and pointed it at Hinkle.

"Now go!" he shrieked in a shrill voice. "Right now. And run! RUN!"

The command in his voice awed Hinkle. Despite the surging of a turmoil of conflicting emotions within him, he turned and ran.

"Don't stop till you reach the lagoon!" Parmenter ordered after him.

"Damn them and their mobs and lawsuits!" was the last thing Hinkle heard him growl.

HE reached the lagoon and looked around. Parmenter was working feverishly, tossing greens on a rapidly growing stack.

Now there came a hubbub from the direction of the 63rd street entrance, the rattle of motorcycles, shouts, the crashing of brushwood, and an oppressive, heavy thudding. In a moment, half a dozen motorcycles drew up

beside Dr. Hinkle. A hundred yards away, a huge, towering bulk loomed past. The great guinea-pig thundered by, its arched brown-and-white back as high as an apartment house, crashing through shrubbery, flattening out trees, sweeping aside fences and bridges as though they had been spider-webs. It skimmed along, eagerly nosing at the ground, following the train of vegetables, piping its impatient huge, fluty whistles, ripping up lawns and driveways in frantic attempts to pick up the tiny fragments of food.

Suddenly it sighted the heap of food. It gave a gigantic leap in that direction, and ran.

"Parmenter!" shrieked Hinkle, and started out toward the busy figure of the scientist. A dozen hands seized him and jerked him back.

"Parmenter!" he moaned again, impotently.

Parmenter looked up at the yells of the motorcycle police. They were making Hinkle's ears ring with their shouts.

"Look out!"

"Come here!"

"What's the matter with you?"

Parmenter waved a light gesture to them, and calmly stepped out of the way of the gigantic rodent. The pig hungrily plunged its snout into the succulent food he had prepared for it. Hinkle covered his face with his hands. The last thing he saw was Parmenter reaching out his hand to stroke the towering side of the busily feeding guinea-pig.

He also recollects momentarily hearing the roar of the airplane describing figure "8's" high in the air over the baseball park. Suddenly there was a long, wailing screech in the air, and a terrific roar. A volcano suddenly seemed to burst where the guinea-pig had been munching. Vegetables, guinea-pig, Parmenter, all disappeared in a flash. In their place was a wall of smoke, rising swiftly upward, with black fragments whirling and shooting in all directions.

For five minutes, Hell roared and churned and blazed out there. The din was deafening, crushing. Showers of dirt and spatters of blood reached Hinkle and the motorcycle men. Then it stopped suddenly short, leaving a strange, painful stillness, punctuated by the feeble rattle of the airplane.

Out where the baseball field had been, a huge crater yawned. When the smoke eventually cleared out of it, there was no guinea-pig. Here and there were bloody masses of something lying about the acrid, smoking earth.

For many minutes, Dr. Hinkle stood on the brink of the reeking chasm, his hat in his hand, his head bowed.

THE END

OUT of the SUB-UNIVERSE

By R. F. STARZL

The romantic notion that atoms contain microscopic universes with suns and planets like those in our solar system gained Ray Cummings instant literary success when he used it as the basis of his now-famous story, The Girl in the Golden Atom, *serialized in* ALL-STORY MAGAZINE *beginning Mar. 15, 1919. The theme was employed over and over again after that without much variation until R. F. Starzl, with his first professional appearance in* AMAZING STORIES QUARTERLY *for Summer, 1928, introduced an element which no previous author had considered; and which, if one accepted the original concept of worlds within worlds, was plausible enough to place a damper on the enthusiasm of subsequent science fiction authors for this idea. The originality of Starzl's story won him the cover of the issue in which it appeared, and the poignancy with which he handled the humanitarian aspects won him much praise. He went on to become one of the more popular authors of his period.*

IF YOU really are so anxious to go, I won't keep you from going any more," said Professor Halley with a sigh, to the young man who sat opposite to him in his laboratory. "Eventually it will become necessary for a human being to make the journey, and no one is better qualified than you to make an accurate report."

"Indeed, I should think not," smiled Hal McLaren, his friend and pupil, "as long as I've been your assistant, and, you might say, co-discoverer. But—" his

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Illustrated by FRANK R. PAUL



As he watched them in stupefactian, looking vainly far McLaren and Shirley a man separated himself fram the crowd, walked ta the edge af the table, made a deep obeisance, and called: "Where are we?"

eyes clouded, "I don't know about Shirley. She wants to go along."

"I think you should let her go along if she wants to," said Halley slowly. "You know that I love my daughter even more than she loves you, but I realize that if you failed to come back, as our experimental rabbits failed to come back, she could never be happy again. She would rather be with you, no matter how inhospitable the little world to which you are going."

"But I will come back!" insisted Hale McLaren urgently. "We know why our experimental animals did not return. As soon as they arrived on the surface of whatever little planet they happened to land on, they did not bother to wonder where they might be. They simply wandered on, and of course it was impossible for our apparatus to find them again. You may be sure that I won't leave the landing spot."

"Nevertheless, it is possible you may fail to return. Shirley is almost a grown woman. We will explain the dangers to her, and if she still wants to go, she shall go."

He stepped to the telephone and called the number of his home, only a short distance from the little inland college where he was head of the physics department. In a few minutes Shirley came into the presence of the two men and regarded their soberness amusedly.

"Whose funeral are you holding today?" she asked.

"Don't talk of funerals at a time like this," said McLaren, little crossly. "We called you over here to explain to you again the danger of the trip you want to make with me. Frankly, I don't want you along, but your father says you can come if you want to."

"Of course I'm going!" she retorted with mock defiance. "Do you think I want to lose you to some atomic vamp?"

"This is serious," he persisted, refusing for once to yield to her rallying. He led the way to the corner of the big, bare room, where he moved aside a denim curtain sliding on a wire, which hid a maze of enigmatic apparatus, evidently electrical in its nature. In the center of a large helix, on a base of peculiar translucent green material, stood a great glass bell, large enough for two or three persons to stand inside. A bank of high-voltage vacuum tubes against one wall was connected by means of heavy copper tubing to various points on the helix. The translucent green base was supported on a number of cylinders, which formed a hydraulic hoist so that the heavy green

disc could be lowered in order to permit the introduction of objects under the independently supported bell.

"I'm going to start in a few minutes," McLaren informed Shirley, and despite his assumed brusqueness, his voice betrayed a tremor of tenderness. "Your father is going to explain the danger to you, and if you still want to go, we start together."

"You know, Shirley" began Professor Halley in his best class-room manner, "that Hale and I have been engaging extensively in research work to discover the ultimate composition of matter. I will admit that we are as much in the dark regarding our primary quest as ever, but in our researches we have opened new vistas that are fully as beautiful and as interesting as the truths we first sought.

"By utilizing the newly discovered cosmic ray, which has a wave-length infinitely shorter than any other known kind of light, we have been able to get circumstantial evidence that electrons do not consist solely of a negative electric charge, as physicists have thought before, but that this charge is actually held by a real particle of matter, so infinitely small that we would never get direct evidence of its existence by the older methods.

"While pursuing these studies, we stumbled upon another property of the cosmic ray. We found that certain harmonics of the ray, when enormously amplified, have the property of reducing or increasing the mass and volume of all matter, without changing its form. We have discovered no limit to this power. We believe it is infinite.

"Now this suggests a possible solution of the problem of the constitution of the universe. Could we prove that the atom, with its central nucleus and its satellites, called electrons, is really only a miniature universe, in fact and not by analogy only, we could safely assume that the constituents of the infra-universe beneath us and the super-universe above us are only links of a chain that stretches into infinity!"

Professor Halley paused. His assistant was flushed and enthusiastic, and his daughter's cheeks glowed brightly and her eyes sparkled. But she was not looking at the apparatus; she was looking at the smooth, dark hair of her fiancé.

"We have sent things into that sub-universe," he continued, "chairs, coins, glasses, bricks and things like that. And we have brought some of them back. But when we sent guinea pigs or rabbits, or a stray dog

into the world of mystery, we could not bring them back. Hale thinks the animals may have wandered away, out of focus of our rays. I don't know. He may be right, or they may have met some terrible unknown fate. Now he offers himself for the experiment. It is dangerous. It may be ghastly. But if you wish to go with him, you may. Your mother is dead. You may leave me lonely in my old age; but you may go—for science!"

A solemn hush followed the simple words. Then Shirley said clearly: "I will go."

THE PHYSICIST turned his head for a moment. When he faced them again, there was no sign of his mental struggle. Firmly, he threw a lever, and the green base silently lowered to the floor. McLaren and the girl stepped upon it, and when it rose again it carried them into the glass bell. The professor turned to the raised platform where the control board was located.

"Good-bye!" he called. "I'll bring you back when half an hour has passed."

"Good-bye!" they returned, their voices muffled.

A powerful generator sprang into action, filling the laboratory with its high-pitched whine. The vacuum tubes glowed dully, and a powerful odor of ozone permeated the air. With a loud crash, the high-tension electricity discharged between adjacent turns of the helix. The professor hastened to adjust a condenser, and again the silence was broken only by the whine of the generator and a low humming.

As the professor continued to adjust the controls, the bell gradually filled with a deep violet light that swayed and swirled tenuously like the drapes of an aurora borealis. The light swirled around the man and the girl, at times almost hiding them from view. It gradually concentrated toward the bottom of the bell, seeming to cling to the green base, intertwining the two living forms until it almost hid them from view. Yet they continued to smile and wave encouragement.

And now it was evident that they were growing smaller. Already they were less than four-feet tall, and as the apparatus was brought more and more into perfect resonance, their rate of shrinkage accelerated. Soon they were but a foot high, standing in a sea of violet light, then six inches, then hardly an inch. The professor turned off the generator.

The girl and the man now walked the few inches necessary to bring them to the exact center of the base. Here, in a slight depression in the smooth material, was a tiny granule of carbon, one

of the atoms of which they were to explore. It was so tiny that it could hardly be seen under the microscope, ordinarily, yet to McLaren, it must already have become plainly visible, for he soon spoke to the girl and she joined him, standing with him very closely near a spot on the floor which he indicated.

Again the mysterious harmonics of the cosmic ray were brought into action, and the two tiny figures vanished from sight. The professor stayed at the controls, his eyes fixed anxiously on his watch until the proper time had elapsed, as indicated by his calculations. He stopped the dynamo again and laid his watch on the table. He marked the time when he should recall them, 10 minutes after four, and paced nervously up and down the room in which he was now alone. Moisture beading his brow, he stopped and stared at the slight depression in which lay a million universes, each one as complete and as perfect as his own, and in one of those universes was a whirling speck on which he had deposited his daughter and best-loved assistant.

He started as the telephone whirred and disposed of a student who wanted to make a trifling inquiry. Then he went back to his watch again, listened to see if his watch might have stopped. It was very still in the laboratory, and when a small rill of water suddenly cascaded out of the cooling jacket of one of the heavy-duty vacuum tubes, the noise seemed loud and strident.

A new thought was now harassing Professor Halley. Suppose that in that unthinkably small world, there were dangerous creatures, whom Hale and Shirley might be battling for their lives even at that moment. Perhaps this world might happen to be a blazing sun; suppose they had gasped their lives out on a sterile and airless moon? He looked at his watch again. The half-hour was almost up. A few more minutes, and they'd be ready and waiting to come back—wouldn't do to turn on the ray while they might be a short distance away, out of focus.——A few more seconds——now!

WITH a fierce sweep, he threw the switch and the violet light filled the glass bell again. Quickly he reversed the current —then crept to the base of the glass dome so that he might see the returned wanderers as soon as they grew into visibility.

Within a few minutes a small cloudy patch appeared in the glassy depression where the microscopic granule of carbon lay. Before the physicist's eyes this spot resolved itself into hundreds of tiny dots—dots that grew rapidly until they resembled minute

upright pegs—pegs that presently grew large enough to show arms and legs. Small human-like creatures that were plainly men and women by the time they were half an inch tall. Men and women that grew and walked about, and were evidently greatly perturbed.

Halley watched them with amazement until they were a few inches tall. He did not move until they began to be so crowded that there was danger of smothering some of them. Then he leaped to the switch to stop their growth, and lowered the green disc until it was at the same level as the table, to which some of the more venturesome now jumped for the sake of more room. As he watched them in stupefaction, looking vainly for McLaren and Shirley, a man separated himself from the crowd, walked to the edge of the table, made a deep obeisance, and called:

"Where are we?"

His voice was thin and reedy, like the chirp of an insect, and his accent was slurred and difficult to understand. Yet he spoke recognizable English.

"You are on earth," said Halley automatically.

This remark created the most profound impression. A thin, sighing cry arose from the little people, and many of them prostrated themselves. They wore filmy, short robes that came to their knees, held to their bodies by girdles. Men and women were dressed pretty nearly alike, but there was a well defined plan of ornamentation which distinguished the sexes.

The leader turned on them and cried.

"Hark! Hark! Is it not as we, your priests, have told you! To the faithful shall it be granted to be carried from our vale of tears to the Earth, with its portals of gold, where the milk and honey flows. You have heard the voice of the Angel. In a voice of thunder he has told you, you are at the gateway of the Earth, while those who believe not shall be cast into the outer darkness, where there is wailing and gnashing of teeth!

Someone in the background began a hymn. The mass of pygmy humanity joined, and the faint insect-like chorus filled the room.

Halley addressed the priest again.

"Where do you come from?"

"We are citizens of Elektron, so named by our illustrious ancestors, Haël, the Man, and Shuërrely, the Woman, who came to our planet in its youth, aeons and aeons ago—so many millions of years ago that they are to be reckoned only in geological epochs."

"How did you know the name of our earth?"

"It was handed down to us

from generation to generation. It is preserved in our monuments and temples and in the records of our wise men. We knew for many ages that it is the elysium of perfection—the place of infinite happiness. For did not our illustrious forebears, Haël and Shuërrely, pine for the Earth, though they came to our Elektron when it was a young planet with a soft climate, and rich in luscious fruits?"

"You say Hale and Shirley came to your planet many ages ago? Wasn't your planet peopled then?"

"There were animals, some of terrifying size and frightful armament. But our Earth-sent ancestors, through superior cunning, overcame them, and their children gradually conquered all of Elektron. We are their descendants, but we have preserved their language, and their traditions, and their religion, and we treasured the Great Promise."

"The Great Promise?"

"The Great Promise," the Elektronite intoned, almost sonorously, despite his small size, "was given us by Haël and Shuërrely. They declared that a great wizard, an Angel of superlative power and understanding, would some day penetrate the vast empty Earth. On the spot where they first appeared, they commanded that their children reside and await the coming of the Angel, which they called Cosmicray. Many were there who fell from that true religion, but we have builded ourselves a temple on that sacred spot, and The Great Promise has been kept!"

Halley said to them dully, pain in his heart, "I am Shirley's father and Hale's friend, and it is not an hour since I sent them to your Elektron!"

But his grandchildren a thousand generations removed, again prostrated themselves and burst into song anew.

PROFESSOR HALLEY was in a decidedly awkward position. He narrowly escaped being indicted for murder. The disappearance of his daughter and his assistant naturally provoked inquiry, and the ugly suspicion was current that he had done away with them and consumed the bodies in his formidable looking Cosmic Ray machine.

Curiously enough, the proof which finally cleared him of the murder suspicion got him into trouble with the immigration authorities, who did not know what to do with several hundred lilliputian people who couldn't be deported to anywhere. Professor Halley positively refused to send them back to Elektron unless they agreed to go of their own free will, and none of them wanted to go back. Finally the immigration authorities consented to

admit the Elektronites under bond, after they had been increased to normal size. Friends were found who assisted them in adjusting themselves to a new type of civilization, and according to latest reports, most of them are getting along very well.

The writer, after many attempts, finally obtained from Professor Halley a first-hand account of his experience and a detailed explanation of the operation of his invention. Skipping the technical details, which have nothing to do with this story, it is only necessary to give here the professor's own explanation of the remarkably fast life-cycle as lived on Elektron.

"I blame myself," said Professor Halley sadly, "for overlooking this important point. While it is true that the sub-universe resembles our own; while it is true that the electrons follow their orbits in a manner analogous to the planets around the suns; yet I overlooked the fact that due to the great difference in size there is also an enormous difference in time. It takes the earth a year to go around the sun; an electron circles its positive nucleus millions of times a second. Yet every time it completes its orbit it is like a year to the inhabitants.

"Before I had time to even blink an eye, Shirley and Hale had lived, loved, died, and many generations of their children had gone through their life cycles. It was normal to them—to us it was unthinkably brief."

He turned his patient face wearily toward the window, staring over the broad campus with unseeing eyes. They say his scientific apparatus is dusty from disuse, but the college board has decided to keep him on the faculty as long as he lives. He is a gentle, pathetic old man who will not live long.

THE END

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"I, ROBOT"

Illustrated by FUQUA

IF THERE *were to be a reader analysis of the most popular fictional character ever to appear in* AMAZING STORIES, *Adam Link, the robot created by Eando Binder for* I, Robot, *would be a serious contender for the distinction —even in a contest with such celebrated figures as John Carter, Buck Rogers, Professor Jameson, Taine of San Francisco, and Horsesense Hank. Even before the publication of* I, Robot, *Binder was regarded as one of the leading authors of the period. But he added new laurels to his reputation when he struck upon the idea of reversing the time-worn Frankenstein monster theme and making the artificial creation a hero instead of a menace. The idea set off a chain reaction that terminated in literary legalization of the rights and psychology of robots when Isaac Asimov framed the three "Laws of Robotics," forever emancipating the robot from the prejudice of inbuilt villainy.*

The notion of humanizing machines was already well advanced when I, Robot *appeared,*



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"I raised the floorboards, and in a short time had substituted batteries."

but Binder's bold presentation in black and white terms provided the catalyst for a complete change of viewpoint, creating a vogue for robot stories that had them challenging interplanetary adventures for popularity. Eando Binder left the science fiction field in 1941. For more than 10 years he wrote the script continuity for Captain Marvel, a comic magazine character so popular that Hollywood based a motion picture serial on his adventures. Today, Binder has moved closer to the fold as editor of SPACE WORLD, *a serious non-fiction magazine devoted to developments in the advancement of space exploration.*

My Creation

MUCH of what has occurred puzzles me. But I think I am beginning to understand now. You call me a monster, but you are wrong. Utterly wrong!

I will try to prove it to you, in writing. I hope I have time to finish—

I will begin at the beginning. I was born, or created, six months ago, on November 3 of last year. I am a true robot. I am made of wires and wheels, not flesh and blood.

My first recollection of consciousness was a feeling of being chained, and I was. For three days before that, I had been seeing and hearing, but all in a jumble. Now, I had the urge to arise and peer more closely at the strange, moving form that I had seen so many times before me, making sounds.

The moving form was Dr. Link, my creator. He was the only thing that moved, of all the objects within my sight. He and one other object—his dog Terry. Therefore these two objects held my interest more. I hadn't yet learned to associate movement with life.

But on this fourth day, I wanted to approach the two moving shapes and make noises at them. Particularly at the smaller one. His noises were challenging, stirring. They made me want to rise and quiet them. But I was chained. I was held down by them so that, in my blank state of mind, I wouldn't wander off and bring myself to an untimely end, or harm someone.

These things, of course, Dr. Link explained to me later, when I could dissociate my thoughts and understand. I was just like a baby for those three days—a human baby. I am not as other so-called robots were—mere automatized machines designed to obey certain commands or arranged stimuli.

No, I was equipped with a pseudo-brain that could receive *all* stimuli that human brains

could. And with possibilities of eventually learning to rationalize for itself.

But for three days Dr. Link was very anxious about my brain. I was like a human baby and yet I was also like a sensitive, but unorganized, machine, subject to the whim of mechanical chance. My eyes turned when a bit of paper fluttered to the floor. But photoelectric cells had been made before capable of doing the same. My mechanical ears turned to best receive sounds from a certain direction, but any scientist could duplicate that trick with sonic-relays.

The question was—did my brain, to which the eyes and ears were connected, hold on to these various impressions for future use? Did I have, in short—*memory?*

THREE days I was like a newborn baby. And Dr. Link was like a worried father, wondering if his child had been born a hopeless idiot. But on the fourth day, he feared I was a wild animal. I began to make rasping sounds with my vocal apparatus, in answer to the sharp little noises that the dog Terry made. I shook my swivel head at the same time, and strained against my bonds.

For a while, as Dr. Link told me, he was frightened of me. I seemed like nothing so much as an enraged jungle creature, ready to go berserk. He had more than half a mind to destroy me on the spot.

But one thing changed his mind and saved me.

The little animal, Terry, barking angrily, rushed forward suddenly. It probably wanted to bite me. Dr. Link tried to call it back, but too late. Finding my smooth metal legs adamant, the dog leaped with foolish bravery in my lap, to come at my throat. One of my hands grasped it by the middle, held it up. My metal fingers squeezed too hard and the dog gave out a pained squeal.

Instantaneously, my hand opened to let the creature escape! Instantaneously. My brain had interpreted the sound for what it was. A long chain of memory-association had worked. Three days before, when I had first been brought to life, Dr. Link had stepped on Terry's foot accidently. The dog had squealed its pain. I had seen Dr. Link, at risk of losing his balance, instantly jerk up his foot. Terry had stopped squealing.

Terry squealed when my hand tightened. He would stop when I untightened. Memory-association. The thing psychologists call reflexive reaction. A sign of a living brain.

Dr. Link tells me he let out a cry of pure triumph. He knew at a stroke I had memory. He

knew I was not a wanton monster. He knew I had a thinking organ, and a first-class one. Why? Because I had reacted *instantaneously*. You will realize what that means later.

I LEARNED to walk in three hours. Dr. Link was still taking somewhat of a chance, unbinding my chains. He had no assurance that I would not just blunder away like a witless machine. But he knew he had to teach me to walk before I could learn to talk. The same as he knew he must bring my brain alive fully connected to the appendages and pseudo-organs it was later to use.

If he had simply disconnected my legs and arms for those first three days, my awakening brain would never have been able to use them when connected later. Do you think, if you were suddenly endowed with a third arm, that you could ever use it? Why does it take a cured paralytic so long to regain the use of his natural limbs? Mental blind spots in the brain. Dr. Link had all those strange psychological twists figured out.

Walk first. Talk next. That is the tried-and-true rule used among humans since the dawn of their species. Human babies learn best and fastest that way. And I was a human baby in mind, if not body.

Dr. Link held his breath when I first essayed to rise. I did, slowly, swaying on my metal legs. Up in my head, I had a three-directional spirit-level electrically contacting my brain. It told me automatically what was horizontal, vertical and oblique. My first tentative step, however, wasn't a success. My knee-joints flexed in reverse order. I clattered to my knees, which fortunately were knobbed with thick protective plates so that the more delicate swiveling mechanisms behind weren't harmed.

Dr. Link says I looked up at him like a startled child might. Then I promptly began walking along on my knees, finding this easy. Children would do this more only that it hurts them. I know no hurt.

After I roved up and down the aisles of his workshop for an hour, nicking up his furniture terribly, walking on my knees seemed completely natural. Dr. Link was in a quandary how to get me up to my full height. He tried grasping my arm and pulling me up, but my 300 pounds of weight were too much for him.

My own rapidly increasing curiosity solved the problem. Like a child discovering the thrill of added height with stilts, my next attempt to rise to my full height pleased me. I tried staying up. I finally mastered the technique of alternate use of

limbs and shift of weight forward.

In a couple of hours Dr. Link was leading me up and down the gravel walk around his laboratory. On my legs, it was quite easy for him to pull me along and thus guide me. Little Terry gamboled along at our heels, barking joyfully. The dog had accepted me as a friend.

I was by this time quite docile to Dr. Link's guidance. My impressionable mind had quietly accepted him as a necessary rein and check. I did, he told me later, make tentative movements in odd directions off the path, motivated by vague simuli, but his firm arm pulling me back served instantly to keep me in line. He paraded up and down with me as with an irresponsible oaf.

I would have kept on walking tirelessly for hours, but Dr. Link's burden of years quickly fatigued him and he led me inside. When he had safely gotten me seated in my metal chair, he clicked the switch on my chest that broke the electric current giving me life. And for the fourth time I knew that dreamless non-being which corresponded to my creator's periods of sleep.

My Education

IN three days I learned to talk reasonably well.

I give Dr. Link as much credit as myself. In those three days he pointed out the names of all objects in the laboratory and around. This fund of two hundred or so nouns he supplemented with as many verbs of action as he could demonstrate. Once heard and learned, a word never again was forgotten or obscured to me. Instantaneous comprehension. Photographic memory. Those things I had.

It is difficult to explain. Machinery is precise, unvarying. I am a machine. Electrons perform their tasks instantaneously. Electrons motivate my metallic brain.

Thus, with the intelligence of a child of five at the end of those three days, Dr. Link taught me to read. My photoelectric eyes instantly grasped the connection between speech and letter, as my mentor pointed them out. Thought-association filled in the gaps of understanding. I perceived without delay that the word "lion," for instance, pronounced in its peculiar way, represented a live animal crudely pictured in the book. I have never seen a lion. But I would know one the instant I did.

From primers and first-readers I graduated in less than a week to adult books. Dr. Link laid out an extensive reading course for me, in his large library. It included fiction as well

as factual matter. Into my receptive, retentive brain began to be poured a fund of information and knowledge never before equalled in that short period of time.

There are other things to consider besides my "birth" and "education." First of all the housekeeper. She came in once a week to clean up the house for Dr. Link. He was a recluse, lived by himself, cooked for himself. Retired on an annuity from an invention years before.

The housekeeper had seen me in the process of construction in the past years, but only as as inanimate caricature of a human body. Dr. Link should have known better. When the first Saturday of my life came around, he forgot it was the day she came. He was absorbedly pointing out to me that "to run" meant to go faster than "to walk."

"Demonstrate," Dr. Link asked as I claimed understanding.

Obediently, I took a few slow steps before him. "Walking," I said. Then I retreated a ways and lumbered forward again, running for a few steps. The stone floor clattered under my metallic feet.

"Was—that—right?" I asked in my rather stentorian voice.

At that moment a terrified shriek sounded from the doorway. The housekeeper came up just in time to see me perform.

She screamed, making more noise than even I. "It's the Devil himself! Run, Dr. Link—run! Police—Help—"

She fainted dead away. He revived her and talked soothingly to her, trying to explain what I was, but he had to get a new housekeeper. After this he contrived to remember when Saturday came and on that day kept me hidden in a storeroom reading books.

A trivial incident in itself, perhaps, but very significant, as you who will read this will agree.

TWO MONTHS after my awakening to life, Dr. Link one day spoke to me in a fashion other than as teacher to pupil; spoke to me as man to—man.

"You are the result of twenty years of effort," he said, "and my success amazes even me. You are little short of being a human in mind. You are a monster, a creation, but you are basically human. You have no heredity. Your environment is molding you. You are the proof that mind is an electrical phenomenon, molded by environment. In human beings, their bodies—called heredity—are environment. But out of you I will make a mental wonder!"

His eyes seemed to burn with a strange fire, but this softened as he went on.

"I knew I had something unprecedented and vital twenty years ago when I perfected an iridium-sponge sensitive to the impact of a single electron. It was the sensitivity of thought! Mental currents in the human brain are of this mirco-magnitude. I had the means now of duplicating mind-currents in an artificial medium. From that day to this I worked on the problem.

"It was not long ago that I completed your 'brain'—an intricate complex of iridium-sponge cells. Before I brought it to life, I had your body built by skilled artisans. I wanted you to begin life equipped to live and move in it as nearly in the human way as possible. How eagerly I awaited your debut into the world!"

His eyes shone.

"You surpassed my expectations. You are not merely a thinking robot. A metal man. You are—life! A new kind of life. You can be trained to think, to reason, to perform. In the future, your kind can be of inestimable aid to man and his civilization. You are the first of your kind."

The days and weeks slipped by. My mind matured and gathered knowledge steadily from Dr. Link's library. I was able, in time, to scan and absorb a page at a time of reading matter, as readily as human eyes scan lines. You know of the television principle—a pencil of light moving hundreds of times a second over the object to be transmitted. My eyes, triggered with speedy electrons, could do the same. What I read was absorbed — memorized — instantly. From then on it was part of my knowledge.

Scientific subjects particularly claimed my attention. There was always something indefinable about human things, something I could not quite grasp, but science digested easily, in my science-compounded brain. It was not long before I knew all about myself and why I "ticked," much more fully than most humans know why they live, think and move.

Mechanical principles became starkly simple to me. I made suggestions for improvements in my own make-up that Dr. Link readily agreed upon correcting. We added little universals in my fingers, for example, that made them almost as supple as their human models.

Almost, I say. The human body is a marvelously perfected organic machine. No robot will ever equal it in sheer efficiency and adaptability. I realized my limitations.

Perhaps you will realize what I mean when I say that my eyes

cannot see colors. Or rather, I see just one color, in the blue range. It would take an impossibly complex series of units, bigger than my whole body, to enable me to see all colors. Nature has packed all that in two globes the size of marbles, for *her* robots. She had a billion years to do it. Dr. Link only had twenty years.

But my brain, that was another matter. Equipped with only the two senses of one-color sight and limited sound, it was yet capable of garnishing a full experience. Smell and taste are gastronomic senses. I do not need them. Feeling is a device of Nature's to protect a fragile body. My body is not fragile.

Sight and sound are the only two cerebral senses. Einstein, colorblind, half-dead, and with deadened senses of taste, smell and feeling would still have been Einstein—mentally.

Sleep is only a word to me. When Dr. Link knew he could trust me to take care of myself, he dispensed with the nightly habit of "turning me off." While he slept, I spent the hours reading.

He taught me how to remove the depleted storage battery in the pelvic part of my metal frame when necessary and replace it with a fresh one. This had to be done every 48 hours. Electricity is my life and strength. It is my food. Without it I am so much metal junk.

But I have explained enough of myself. I suspect that ten thousand more pages of description would make no difference in your attitude, you who are even now—

An amusing thing happened one day, not long ago. Yes, I can be amused too. I cannot laugh, but my brain can appreciate the ridiculous. Dr. Link's perennial gardener came to the place, unannounced. Searching for the doctor to ask how he wanted the hedges cut, the man came upon us in the back, walking side by side for Dr. Link's daily light exercise.

The gardener's mouth began speaking and then ludicrously gaped open and stayed that way as he caught a full glimpse of me. But he did not faint in fright as the housekeeper had. He stood there, paralyzed.

"What's the matter, Charley?" queried Dr. Link sharply. He was so used to me that for the moment he had no idea why the gardener should be astonished.

"That—that thing!" gasped the man, finally.

"Oh. Well, it's a robot," said Dr. Link. "Haven't you ever heard of them? An intelligent robot. Speak to him, he'll answer."

After some urging, the gar-

dener sheepishly turned to me. "H-how do you do, Mr. Robot," he stammered.

"How do you do, Mr. Charley," I returned promptly, seeing the amusement in Dr. Link's face. "Nice weather, isn't it?"

For a moment the man looked ready to shriek and run. But he squared his shoulders and curled his lip. "Trickery!" he scoffed. "That thing can't be intelligent. You've got a phonograph inside of it. How about the hedges?"

"I'm afraid," murmured Dr. Link with a chuckle, "that the robot is more intelligent than you, Charley!!" But he said it so the man didn't hear, and then directed how to trim the hedges. Charley didn't do a good job. He seemed to be nervous all day.

My Fate

ONE DAY Dr. Link stared at me proudly.

"You have now," he said, "the intellectual capacity of a man of many years. Soon I'll announce you to the world. You shall take your place in our world, as an independent entity—as a citizen!"

"Yes, Dr. Link," I returned. "Whatever you say. You are my creator—my master."

"Don't think of it that way," he admonished. "In the same sense, you are my son. But a father is not a son's master after his maturity. You have gained that status." He frowned thoughtfully. "You must have a name! Adam!-Adam Link!"

He faced me and put a hand on my shiny chromium shoulder. "Adam Link, what is your choice of future life?"

"I want to serve you, Dr. Link."

"But you will outlive me! And you may outlive several other masters!"

"I will serve any master who will have me," I said slowly. I had been thinking about this before. "I have been created by man. I will serve man."

Perhaps he was testing me. I don't know. But my answers obviously pleased him. "Now," he said, "I will have no fears in announcing you!"

The next day he was dead.

That was three days ago. I was in the storeroom, reading—it was housekeeper's day. I heard the noise. I ran up the steps, into the laboratory. Dr. Link lay with skull crushed. A loose angle-iron of a transformer hung on an insulated platform on the wall had slipped and crashed down on his head while he sat there before his workbench. I raised his head, slumped over the bench, to better see the wound. Death had been instantaneous.

These are the facts. I turned the angle-iron back myself. The

blood on my fingers resulted when I raised his head, not knowing for the moment that he was stark dead. In a sense, I was responsible for the accident, for in my early days of walking I had once blundered against the transformer shelf and nearly torn it loose. We should have repaired it.

But that I am his murderer, as you all believe, is not true.

The housekeeper had also heard the noise and came from the house to investigate. She took one look. She saw me bending over the doctor, his head torn and bloody—she fled, too frightened to make a sound.

It would be hard to describe my thoughts. The little dog Terry sniffed at the body, sensed the calamity, and went down on his belly, whimpering. He felt the loss of a master. So did I. I am not sure what your emotion of sorrow is. Perhaps I cannot feel that deeply. But I do know that the sunlight seemed suddenly faded to me.

My thoughts are rapid. I stood there only a minute, but in that time I made up my mind to leave. This again has been misinterpreted. You considered that an admission of guilt, the criminal escaping from the scene of his crime. In my case it was a full-fledged desire to go out into the world, find a place in it.

Dr. Link, and my life with him, were a closed book. No use now to stay and watch ceremonials. He had launched my life. He was gone. My place now must be somewhere out in the world I had never seen. No thought entered my mind of what you humans would decide about me. I thought all men were like Dr. Link.

FIRST of all I took a fresh battery, replacing my half-depleted one. I would need another in 48 hours, but I was sure this would be taken care of by anyone to whom I made the request.

I left. Terry followed me. He has been with me all the time. I have heard a dog is man's best friend. Even a metal man's.

My conceptions of geography soon proved hazy at best. I had pictured earth as teeming with humans and cities, with not much space between. I had estimated that the city Dr. Link spoke of must be just over the hill from his secluded country home. Yet the woods I traversed seemed endless.

It was not till hours later that I met the little girl. She had been dangling her bare legs into a brook, sitting on a flat rock. I approached to ask where the city was. She turned when I was still thirty feet away. My internal mechanisms do not run silently. They make a steady noise that

Dr. Link always described as a handful of coins jingling together.

The little girl's face contorted as soon as she saw me. I must be a fearsome sight indeed in your eyes. Screaming her fear, she blindly jumped up, lost her balance and fell into the stream.

I knew what drowning was. I knew I must save her. I knelt at the rock's edge and reached down for her. I managed to grasp one of her arms and pull her up. I could feel the bones of her thin little wrist crack. I had forgotten my strength.

I had to grasp her little leg with my other hand, to pull her up. The livid marks showed on her white flesh when I laid her on the grass. I can guess now what interpretation was put on all this. A terrible, raving monster, I had tried to drown her and break her little body in wanton savageness!

You others of her picnic party appeared then, in answer to her cries. You women screamed and fainted. You men snarled and threw rocks at me. But what strange bravery imbued the woman, probably the child's mother, who ran up under my very feet to snatch up her loved one? I admired her. The rest of you I despised for not listening to my attempts to explain. You drowned out my voice with your screams and shouts.

"Dr. Link's robot!—it's escaped and gone crazy!—he shouldn't have made that monster!—get the police!—nearly killed poor Frances!—

With these garbled shouts to one another, you withdrew. You didn't notice that Terry was barking angrily—at you. Can you fool a dog? We went on.

Now my thoughts really became puzzled. Here at last was something I could not rationalize. This was so different from the world I had learned about in books. What subtle things lay behind the printed words that I had read? What had happened to the sane and orderly world my mind had conjured for itself?

NIGHT came. I had to stop and stay still in the dark. I leaned against a tree motionlessly. For a while I heard little Terry snooping around in the brush for something to eat. I heard him gnawing something. Then later he curled up at my feet and slept. The hours passed slowly. My thoughts would not come to a conclusion about the recent occurrence. Monster! Why had they believed that?

Once, in the still distance, I heard a murmur as of a crowd of people. I saw some lights. They had significance the next day. At dawn I nudged Terry with my toe and we walked on. The same murmur arose, ap-

proached. Then I saw you, a crowd of you, men with clubs, scythes and guns. You spied me and a shout went up. You hung together as you advanced.

Then something struck my frontal plate with a sharp clang. One of you had shot.

"Stop! Wait!" I shouted, knowing I must talk to you, find out why I was being hunted like a wild beast. I had taken a step forward, hand upraised. But you would not listen. More shots rang out, denting my metal body. I turned and ran. A bullet in a vital spot would ruin me, as much as a human.

You came after me like a pack of hounds, but I outdistanced you, powered by steel muscles. Terry fell behind, lost. Then, as afternoon came, I realized I must get a newly charged battery. Already my limbs were moving sluggishly. In a few more hours, without a new source of current within me, I would fall on the spot and—die.

And I did not want to die!

I knew I must find a road to the city. I finally came upon a winding dirt road and followed it in hope. When I saw a car parked at the side of the road ahead of me, I knew I was saved, for Dr. Link's car had the same sort of battery I used. There was no one around the car. Much as a starving man would take the first meal available, I raised the floorboards and in a short while had substituted batteries.

New strength coursed through my body. I straightened up just as two people came arm-in-arm from among the trees, a young man and woman. They caught sight of me. Incredulous shock came into their faces. The girl shrank into the boy's arms.

"Do not be alarmed," I said. "I will not harm you. I—"

There was no use going on, I saw that. The boy fainted dead away in the girl's arms and she began dragging him away, wailing hysterically.

I left. My thoughts from then on can best be described as brooding. I did not want to go to the city now. I began to realize I was an outcast in human eyes, from first sight on.

Just as night fell and I stopped, I heard a most welcome sound. Terry's barking! He came up joyfully, wagging his stump of tail. I reached down to scratch his ears. All these hours he had faithfully searched for me. He had probably tracked me by a scent of oil. What can cause such blind devotion—and to a metal man!

Is it because, as Dr. Link once stated, that the body, human or otherwise, is only part of the environment of the mind? And that Terry recognized in me as much of mind as in humans,

despite my alien body? If that is so, it is you who are passing judgment on me as a monster who are in the wrong. And I am convinced it is so!

I hear you now—shouting outside—*beware that you do not drive me to be the monster you call me!..*

THE NEXT dawn precipitated you upon me again. Bullets flew. One struck the joint of my right knee, so that my leg twisted as I ran. One smashed into the right side of my head and shattered the tympanum there, making me deaf on that side.

But the bullet that hurt most was the one that killed Terry!

The shooter of that bullet was twenty yards away. I could have run to him, broken his every bone with my hard, powerful hands. Have you stopped to wonder why I didn't take revenge? Perhaps I should! . . .

I was hopelessly lost all that day. I went in circles through the endless woods. I was trying to get away from the vicinity, from your vengeance. Toward dusk I saw something familiar—Dr. Link's laboratory.

My birthplace! My six month's of life here whirled through my mind with kaleidoscopic rapidity. I wonder if my emotion was akin to what yours can be! Life may be all in the mind. Something gripped me there, throbbingly. The shadows made by a dim gas-jet I lit seemed to dance around me like little Terry had danced. Then I found the book, "Frankenstein," lying on the desk whose drawers had been emptied. Dr. Link's private desk. He had kept the book from me. Why? I read it now, in a half hour, by my page-at-a-time scanning. And then I understood!"

But it is the most stupid premise ever made: that a created man must turn against his creator, against humanity, lacking a soul. The book is all wrong.

Or is it? . . .

As I finish writing this, here among blasted memories, with the spirit of Terry in the shadows, I wonder if I shouldn't . . .

It is close to dawn now. You have me surrounded, cut off. In the light you will rout me out. Your hatred lust is aroused. It will be sated only by my—death.

I have not been so badly damaged that I cannot still summon strength and power enough to ram through your lines and escape. But it would only be at the cost of several of your lives. And that is the reason I have my hand on the switch that can blink out my life with one twist.

Ironic, isn't it. I have the very feelings you are so sure I lack?

(signed) Adam Link.

THE END

The FLYING FOOL

By DAVID H. KELLER, M. D.

Illustrated by MACKAY

THE PRIMARY purpose of a science fiction magazine is to entertain. It so happens that stimulating new ideas entertain science fiction readers the most; therefore, almost in spite of itself, science fiction frequently possesses intellectual content. Beyond that, once in a while an author comes along with a story which—though technically science fiction—incorporates enough universal truth to make it worthy of mainstream consideration. The Flying Fool *is such a story; and the life of Robert Smith, its hero, despite his search for antigravity, echoes in its quiet desperation the plight and yearnings of many of us. Dr. Keller tells Robert Smith's story with infinite compassion and a simplicity of narration that conceals superb artistry. An early discovery of* AMAZING STORIES, *David H. Keller, M.D., was twice voted (in polls conducted by a national magazine in 1934 and 1935) the most popular science fiction writer in the world.* The Flying Fool *easily helps one to understand the basis of his popularity.*

ROBERT SMITH gave an exclamation of astonishment. He turned to his wife and said:

"I see that Einstein has reduced all physics to one law."

Mrs. Smith was darning stockings at the other side of the table. The world that she was living in was a rather new world, but the stockings still had holes in them. In fact, the two dollar silk stockings had as many holes as the fifty cent Lisle variety used to have. Life for Mrs. Smith was not so very interesting. Even her two-year-old daughter, who had most inconsiderately arrived in the eleventh year of an otherwise uneventful companionate marriage, failed to provide the blasé wife with thrill, though she did furnish lots of hard work.

Robert Smith was an inven-

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In fancy Smith was now up in the air. Now he could stay up without turning over. He could press a button and go up, also press another button and slowly come down—like a thistledown.

tor. That is, he was a dreamer of great innovations by night, and a seller of laces and ribbons in a large department store in the daytime. Naturally, such a spending of the twenty-four hours did not provide his wife with the luxuries of life and, gradually, through the years, she had come to regret the fact that her husband was just plain Robert Smith instead of an Edison. Of course, when she married him she was under the delusion that he really would invent something which would make them wealthy. She now saw, after thirteen years of gradually increasing disappointment, that her husband would always remain a salesman of ribbons.

Her husband tried to keep her interested in his dreams. That was hard to do when she had so many stockings to darn and buttons to sew on. Besides, at the end of the day, she was tired. Also her mind had never been much interested in higher mathematics or the laws of physics and all other interesting things that her husband felt useful to him in his nocturnal career as an inventor. Frequently, she did not even have an idea of what he was talking about, and his efforts to tell her, simply added to their mutual dissatisfaction with each other. Something of this kind happened on this particular evening Smith said:

"I see that Einstein has reduced all physics to one law."

His wife looked up from her darning, as she said rather slowly:

"I think that is a good thing. We have too many laws as it is. What State does this man Einstein come from? I do not recall his name. But I really do not see how all the laws could be put into one law. That must be a newspaper mistake."

"Einstein, my dear, is a German," replied her husband.

"Well, of course, they have to be represented. Still I think that they ought to be careful in regard to electing these foreigners. He may be Bolshevik."

"You still do not understand. This man is not a senator. He is a scientist. When it says that he has formulated a new law, it means a law of physics. It has nothing to do with government."

"Well, why didn't you say so in the first place? You said a law. I guess I know what a law is. And another thing, don't yell at me so. You talk so loud that it is no pleasure to listen to you any more. If you would spend your evenings in taking a correspondence course in something instead of reading about things nobody understands, you would get away from that ribbon and lace counter. I showed you that paper about the Improvement Institute. A man was taking that

course and he changed from a salary of twenty dollars a week to ten thousand a year, and he only studied ten weeks. Well, what about this new law?"

"It means this," replied Smith, in a rather low voice, "many centuries ago man realized that light and heat were related. Then Joule and Rumford showed that light, heat and energy are related according to definite physical laws. Thus, energy was added to light and heat. Now, gradually, the scientists have shown that to these three forces can be added matter, space, time, gravitation and electricity. The only factor absent was to determine the relation between electricity and gravitation. According to Einstein, there is only one substance, 'the field,' and this field contains electrical and gravitational components which are closely tied together by a single formula. That, to me," said Smith gravely, "is a most remarkable discovery."

"And to me," replied his wife, "it does not mean a thing."

"But you do not understand just what this means!" almost shouted Robert Smith. "This article says that it means that man can fly. Not in a plane or a balloon, but just go up in the air! The thing that holds us to the earth is gravitation. If that can be overcome, why mankind can go up into space. I believe I see something in that, a very simple machine, which could be produced for a few hundred dollars——"

But his wife interrupted him. She was led to do so by past experience.

"A few hundred dollars would pay our expenses for several menths."

But Robert Smith was so absorbed that he never heard her remark. Just then the baby cried in the next room.

"Robert," said Mrs. Smith, "will you go and tend to the baby? I must finish this mending. You know it is your child as much as it is mine."

"Please stop calling the baby 'it.' She is too old, and besides, she has a very nice name."

Nevertheless, he put down the paper and disappeared into the shadows of the next room to attend to the baby.

WHEN he returned from the care of the baby, he found that his wife had gone to bed. The sounds from the bedroom indicated that she was fast asleep. So, relaxing, Smith started to read the article very carefully. He read that a New York professor was making some startling statements about the new law of Einstein. He prophesied that the time would come when airplanes would be able to remain in the air without en-

gines or visible support; that a man, properly equipped, could step out of a twenty-story window and not be in danger of falling; and that, were it not for the deadly cold of the regions beyond the earth's atmosphere, a trip to the moon might be a very easy matter. This law provided a means for insulating the body against the laws of gravitation.

"That would be rather fine," said Smith, softly, to himself. "That would be the real thing. This air work they are doing now is too complicated. I do not believe that it will ever be popular. Besides, it is so very dependent on machinery and fuel, and a person has to keep going. Now, my idea is to go up in the air about fifty feet and just slowly mosey around. I feel that it would be so much more pleasant than the way they do it now. Then I would want to stop, if I saw anything interesting beneath me, and stay where I was in the air till I had made a thorough examination of the particular object my attention had been called to. You cannot do that in a plane—in one of those things a man has to keep on moving or fall. The big thing would be to have a cheap apparatus, costing a few hundred dollars. Something that would go up easily, stop at any point and stay there in the air; something that would move slowly, be easily guided and in some way obtain all of its power through the air. It would have to go up like a slow elevator and come down like a feather or a thistledown.

"That would be a fine apparatus to own. A man could go on little excursions in the evening, after the wife was asleep, and it would sort of take his mind off of things. There are so many things that I would like to see from the air. I bet Broadway would be an interesting sight, or the Statue of Liberty, and it certainly would be a lark to take a piece of chalk and write your name on the top of the Washington Monument. Of course, for a long trip it would be necessary for me to tell the wife just where I was going—but, perhaps, she would have no objections if I brought back a nice present for her. Going across the ocean would be a little dangerous, but it ought to be safe to go up the Hudson. After a little practice a man could go a great distance, if he had a box of lunch with him.

"It all ought to be rather easy. All we need is a starter and a stopper, and, of course, the stopper would be just a gradual shutting off of the starting force. Then there would have to be something to cause a progressive movement in the air, something like the propeller of an

airplane and something more to guide the thing with, and there would have to be a method of obtaining power from the air; of course, there is lots of power and all kinds of electrical waves, but the question of hooking the engine on to them is a different matter.

"If I could just do that—just that simple invention—I would be rich—perhaps, rich enough to educate the baby. I believe I can do it if I can only work out a few of the details. There would have to be some kind of a chair to sit on and something to keep the whole machine from turning upside down. That would be most embarrassing, even to be a hundred feet in the air and have it turn over and dump you out. I would not like that to happen—at least, not until I have more insurance."

THE NEXT morning he was once again a seller of ribbons and laces, but it was hard to keep his mind on the delicate difference in the tints and colors and the various designs of lace. He sold these things, standing behind a counter, to dozens of ladies standing before the counter, but his soul was far away—in the air. He day-dreamed of floating up and whispering in the ear of the Sphinx, that peculiar woman who could live a thousand generations without betraying a secret or uttering a word. He thought that it would be fine to go slowly over the top of Mount Ararat and see if the Ark was still there, where it had grounded in the days of Noah. He promised himself that he would spend a Sunday over the Battlefield of Gettysburg, a place sacred to him because his grandfather had died there.

That noon, as he ate the lunch that he always brought with him from home, he feverishly read the evening paper. He was still on the trail of Einstein. It was a singular coincidence that he found one of the very facts that he was looking for. It was just a simple statement to the effect that the Bell Telephone laboratories had produced a new alloy called permalloy, which was particularly sensitive in its relation to magnetism. When a bar of it was placed above a magnet, the bar of permalloy rose in the air and floated an inch above the magnet.

That made Robert Smith do a lot of thinking. Could a man pull himself up in the air by lifting on his bootstraps? Suppose there was a magnet and resting on it was a bar of permalloy? Both the magnet and the bar would be of the same size. The bar is repelled by the magnet to such a degree that it rises two inches above it and remains suspended in the air. What Smith

could not make out was this problem. Suppose the bar was fastened to the magnet so that it could only rise one inch in the air? But is the other inch to be ignored? There is a pull there. Would it go up the extra inch? If it did, it would have to pull the magnet with it, as they cannot be more than an inch apart. If it kept on doing that, what was there to keep it from going on right up into the air? The magnet would be the same. The permalloy would always try to withdraw two inches from the magnet, and in doing so, it would always pull the magnet upward. *If it did, then gravitation would be overcome,* and if a man was seated on the bar, he would go up with the magnet and the bar.

Of course, Smith realized that certain formulas would have to be determined. Just how much should the bar of permalloy weigh in proportion to its weight or in relation to the size of the magnet? How long would the magnet retain its magnetism? Could it be recharged by electrical induction while it was in the air? But to Smith's eager mind these were but details, petty trifles to be worked out after the larger facts had been determined. What he was sure of was his ability to rise in the air, provided he had a magnet and a bar of permalloy and a chair to sit on fastened to the bar.

Hastily eating his dinner, he went to a public telephone booth and called up the Bell Telephone Company. Had they any permalloy to sell? To his surprise, they said they had and how much did he want—it was ten dollars a pound—in the form on a very fine wire. He said he would call them later, and went back to the ribbon and lace counter. He knew that he could secure a magnet without difficulty, but how could he manage with five pounds of wire? For fifty dollars was about all that he could spend. Even that was a birthday present that he had carefully concealed from his wife. Then the wonderful thought came to him. After long months of careful saving on the part of his wife, she had finally put aside enough to get a new suit for him—a real tailor-made suit. There had been several trying periods of measurements and fittings. He would take this five pounds of fine wire and have the tailor sew it in, in some way, all through the suit. Then all he would need was a chair tied to the magnet and himself tied to the chair—and up they would go.

"I may be a flying fool," he whispered to himself, "but it certainly will be wonderful."

It took him several days of going without his lunch to buy the metal wire and show the puzzled tailor just what he

wanted done. Of course, this increased the charge for the suit, but Smith paid that himself out of his personal allowance. He was particular in his instructions that under no circumstance was his wife to be told about the wire. He finally obtained a promise that the suit would be delivered in a few weeks. As a matter of fact it was delivered and hung in the moth bag a full week before the rest of the machine was completed.

IN FANCY, Smith was now up in the air. He had taken no time at all in perfecting a simple arrangement of wires which, when a button was pressed, would extract a powerful current of electricity from the atmosphere, and this, as everyone has known from the days of Benjamin Franklin, is constantly surcharged with this mysterious force. It was no trick at all to get the magnet and attach to it the wires. He arranged to have the starting button at the side of his chair. He was going to press the button; that would greatly increase the magnetism which would repel the permalloy in his clothes, and up they would go. When he wanted to come down, he would cease to pull the electricity from the air, the magnetic force would slowly wear out, and down he would come, like a thistledown—he liked the idea of coming down like a thistledown—any other thought made him shudder.

But the question of balance bothered him. Suppose he tilted? And turned over? Where would the pull come then? Certainly it would be difficult to enjoy a ride upside down. And landing on the ground, head first, tied to a chair, would be too ridiculous. Then he thought of the gyroscope! That solved everything. It would be the stabilizer. Nothing would be easier than to have a gyroscope under the chair. All he had to do was to make the gyroscope the wheel of an electric motor, with finely adjusted contact mechanisms to reduce to a minimum the problem of friction. He could run the motor from the same electrical source that he used to electrically induct his magnet. Now, he was up in the air and was going to stay right-side-up.

The securing of a small gyroscope was a problem that almost proved to be too great for the ribbon seller. He probably never would have solved it were it not for a friend, who, knowing of his problem, told him of a small private yacht that was being torn to pieces as junk. This small pleasure boat had an equally small gyroscope to keep it from rolling at sea. Smith found out what the cost was, and it was possible, by selling some very

special jewels left him by his father to buy that gyroscope. It was very small, but it worked perfectly and fitted to perfection in the space under the seat of the chair. And it was almost noiseless.

Now he could stay up without turning over. He could press a button and go up, and another button and slowly come down, like a thistledown, and all the time the little gyroscope would keep him right side up. Now, all his problems were solved and all his money gone, and he still had the problem of moving through the air. It would not be very interesting to just go up from the balcony and stay up for a while and then come down on the balcony again, though, of course, that would be pleasant on a hot evening and rather a relief at other times. But he wanted to move. He wanted to go somewhere, if only to Coney Island. He grew rather tired of seeing his wife darn stockings—every night; though it was dear of her to do so.

Then, as a last resort, he conceived the idea of using an electric fan. He could attach it to the back of the chair, or he could fix it so that it would have a movable point of attachment. Then he could go and come and perhaps even turn around. He would not go fast—but he did not want to go fast—He just wanted to go somewhere and see something. It made no difference what it was, just so he could get away from the daily grind of laces and ribbons and ribbons and laces and more laces and starting to work every morning and back again every night and stockings—He was ashamed of himself, but he was nervous about those stockings, and he knew that it was his fault that they were not thrown away and new ones bought. Men were wearing such fancy stockings now-a-days, but he only got stockings at Christmas as presents from his wife, and from his mother.

He had an electric fan. He experimented and found, to his surprise, that he could run it on electricity taken from the air in the same way that he was securing the electric current for the motor of the gyroscope. And right there Robert Smith hovered on the edge of becoming a multimillionaire. Had he patented that little idea and protected the patent, his wife would have no more need to darn stockings, but all he could think of at that time was going up in the air. He adored calling himself a flying fool. It sounded so very devilish.

Naturally, he could not assemble the pieces of this apparatus without his wife having

some idea that a new invention was in process of birth. But she had lived through so many of these wonderful moneymaking plans that never amounted to a hill of beans, that this latest effort of her husband's left her cold and uninterested. She simply deplored silently and openly the fact that he was not getting more sleep, as she was sure this insomnia would result in his lowered efficiency as a salesman of ribbons and laces, and that, as she often said, was really the way that they managed to live from year to year, and it was especially important now, since little Angelica had come to live with them. She always said it that way, as though, by placing the initiative on the baby, she took from her own shoulders the burden of having made a failure of the major factor of companionate marriage.

The Smiths lived in an old-fashioned part of the city. In fact, unkind friends said behind their backs that they lived in the slums. However, their house had a balcony extending back from the second story and this balcony having no roof, it was especially desirable as a starting and landing place for Smith's new anti-gravitation machine. Two small bedrooms opened out on this balcony by French windows. The fact that the bedrooms connected with each other, made it an ideal arrangement. The baby slept in one room and her parents in the other. When she cried, it was very easy for the one who heard her first to look after her —and Robert Smith was a light sleeper.

GRADUALLY, Smith assembled his machine on this balcony. When he was not working at it, he kept it covered with an old canvas. It just looked like an old chair to his wife; so, she did not bother it, and as the weather was cold, she humored him by allowing him to use the electric fan. In her way she loved him, but, perhaps, her affection would have equaled her devotion had he been able to secure for the family a better income. However, she was really in love with him, and even if life had not brought her all she had hoped for, she was inclined to be philosophical about it. So she left his funny old chair alone, and kept on darning the stockings and trying to make a dollar buy two dollars' worth of food.

Finally, the machine was completed. Smith sat in the chair one night and tested the different parts. One button started the gyroscope, another started the fan, while a third made the fan move slowly on its metal track. There were other buttons connected with the magnet, but they were useless, so long as he

did not have on his new suit. Several nights after the suit came he waited till his wife was asleep and then lovingly took it out of the moth bag. The tailor had been rather skillful in sewing the wire in through the various garments.

All was ready. Valuable evenings had been spent working on the mathematics of the invention. He wanted to be sure that it was powerful enough to carry his weight and also the weight of the entire machine. Even while he was working, the singular thought came to him that all his calculations were unnecessary, because if the permalloy was repelled by the magnet it had to take with it anything that it was attached to. Right here the idea came to him of a small circular track, with a block of permalloy on wheels, constantly retreating from a magnet on wheels. The very idea of it—the constant revolutions—why, it was almost perpetual motion—made him so dizzy that he nearly fell out of his chair, and his wife insisted on his taking a dose of calomel.

At the end of his calculations he was satisfied that nothing had been neglected. It was just a question of putting on that new suit, strapping himself to the chair and pressing a few buttons. He decided to wait till the moon was full and that would be just one more night. Then when he was sure that his wife was asleep, he would dress and soar. In a peculiar way, that was hard for him to understand,-this first adventure in the air meant freedom to him, and yet he did not comprehend just what it was that he wanted a release from.

All that he was afraid of was that it would rain. Of course, he knew that he could carry an umbrella, but that seemed, somehow, to be hardly suitable.

When the next evening came, he found that all of his fears had been useless. It was not only clear, it was a wonderful night. A strong wind had cleared the atmosphere; it was warm; there was hardly a breath stirring at ten o'clock, and the moonlight was so strong that it was almost possible to see the print on a newspaper.

Mrs. Smith unconsciously helped her husband in his plans by going to bed early. In fact, she was sound asleep by nine. The baby had been asleep for several hours. Smith tiptoed into their bedroom, took the new suit, moth bag and all, and tiptoed into the baby's room. There he rapidly and as quietly as he could, changed suits. He was glad to see how well the coat and vest fitted him. On his way to the balcony he had to pass the little crib. He paused a moment,

even touched the little girl's hand. She had always been a wonder to him—he never fully understood just how it was that she had come into his life—but at night, as she slept, she was almost a miracle. For a long minute he hung over the crib, to satisfy himself that she was breathing. And the love that passed between them in some way recalled another love, and he thought of his wife, of what had been, of their early hopes and ambitions and how, gradually, one by one those hopes had slowly been blasted, and now, at the age of nearly fifty, he was still a salesman of ribbons and laces. He quietly walked to her bedside —she was still a pretty woman— and he realized, as never before, just what she had meant to him and what she had done for him and sacrificed for him in all those years of their married life. And in addition, she had somehow found that little new love of his, the charming Dresden china baby, Angelica. Yes, he was lucky to have her as his wife.

He bent over and kissed her hair and then, sighing, passed through the door, out on the gallery, where his soaring invention awaited him. He sat down in the chair and started to fasten the straps. Everything was all ready. He had only to press the starting button—

And the baby cried.

SMITH sat still; perhaps she would go to sleep; but she cried again.

A woman's clear voice came to his straining ears:

"Robert, can you take care of the baby? She has cried twice now and I am sure that she needs attention. I am so sleepy, and I know you are still dressed."

"I will attend to her as soon as I can," Smith replied. He unstrapped himself and went into the nursery. Sure enough Angelica needed help. With skillful, loving hands, he quietly cared for her, talking little nonsense verses to her as he did so, in the hope that she would not become wide-awake. But she did. When he left her crib, her little whimperings told him that she wanted him. She even sat up in bed and the next moment was standing up, ready to play.

He tried to persuade her to lie down. He told her that papa was building a flying machine and if she was a good girl, he would let her ride in it, like a bird some day. He had made this promise to her before, and it had always put her to sleep, but this time it only seemed to make her more excited.

"Angie fly birdie," she insisted.

Sighing, Robert Smith took his daughter out of the crib, and then the wonderful thought came to him that it would be a

fine thing to take her with him. He could hold her in one arm and manage all the buttons with the other hand. He carried Angelica out on the balcony and reseated himself in the chair. It was a little hard to strap himself in, but he finally did so, and he even found enough strap left over to put around the baby.

She enjoyed it all.

"Angelica," whispered the gray-haired man, "your father is a flying fool and so is his little baby."

"Angie fly birdie," she cooed.

Robert Smith shut his eyes. At last he had come to the parting of the ways. Here was freedom and adventure. His heart began to beat faster; he held the baby so tight that she began to whimper—then *he pressed the starter button.*

And waited.

Nothing happened—not a thing was different—sickened with disappointment, he realized that nothing would happen. Somewhere there had been a mistake.

As he sat there, the little girl went to sleep. Tired of waiting, anaesthetized by the fresh air, perhaps a little cold, she had cuddled close to her father and gone to sleep. Almost as in a dream, Robert Smith unstrapped himself and carried his sleeping daughter to her crib. She simply relaxed and kept on sleeping. Then Smith undressed—he put his new suit back in the moth bag and hung it up—and then he prepared for bed. Somehow, his wife awoke. It was a rather unusual thing for her to do this, and Smith did not understand it till she started to talk to him.

"You know, Robert, a most unusual thing happened this week, and I have been trying to find time and the right occasion to tell you about it. You know how I planned and saved for that new suit, and how proud I was to think that at last you were going to have one tailormade instead of a hand-me-down. Well, when that suit came, I examined it carefully, and it had the most peculiar wire threaded through it, long pieces. I worked and worked at it and finally got it all out, and I took it to a dealer in old metals and he said he would give a dollar a pound for it, and it weighed just five pounds. So, there I had five dollars, and I spent it for stockings for you. I bought you six pairs, and they are guaranteed to be hole-proof. You needed some new stockings. I have tried to darn them as carefully as I could, but I really don't see how you could wear them, being on your feet the way you are all day. Now, how can you explain that wire in that new suit? I called up the tailor and I believe he was puzzled himself; at least, he acted so."

"It certainly is odd," answered her husband. "But I am glad you bought me the new stockings. You sew too much. Did you buy me striped or colored ones?"

"No. I thought for your ribbon and lace work it would be better to have black ones. Do you know, I am wide-awake? I want to talk. I was reading today about a man's claiming that some day men would float through the air. What do you think of that?"

"I think that any man who wanted to do a thing like that would be a flying fool!" said Robert Smith slowly. Then he forced himself to go to sleep, for the next day he would be busy, selling ribbons and laces.

THE END

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A Classic Reprint from AMAZING STORIES, February, 1931

The Exterminator

By A. HYATT VERRILL

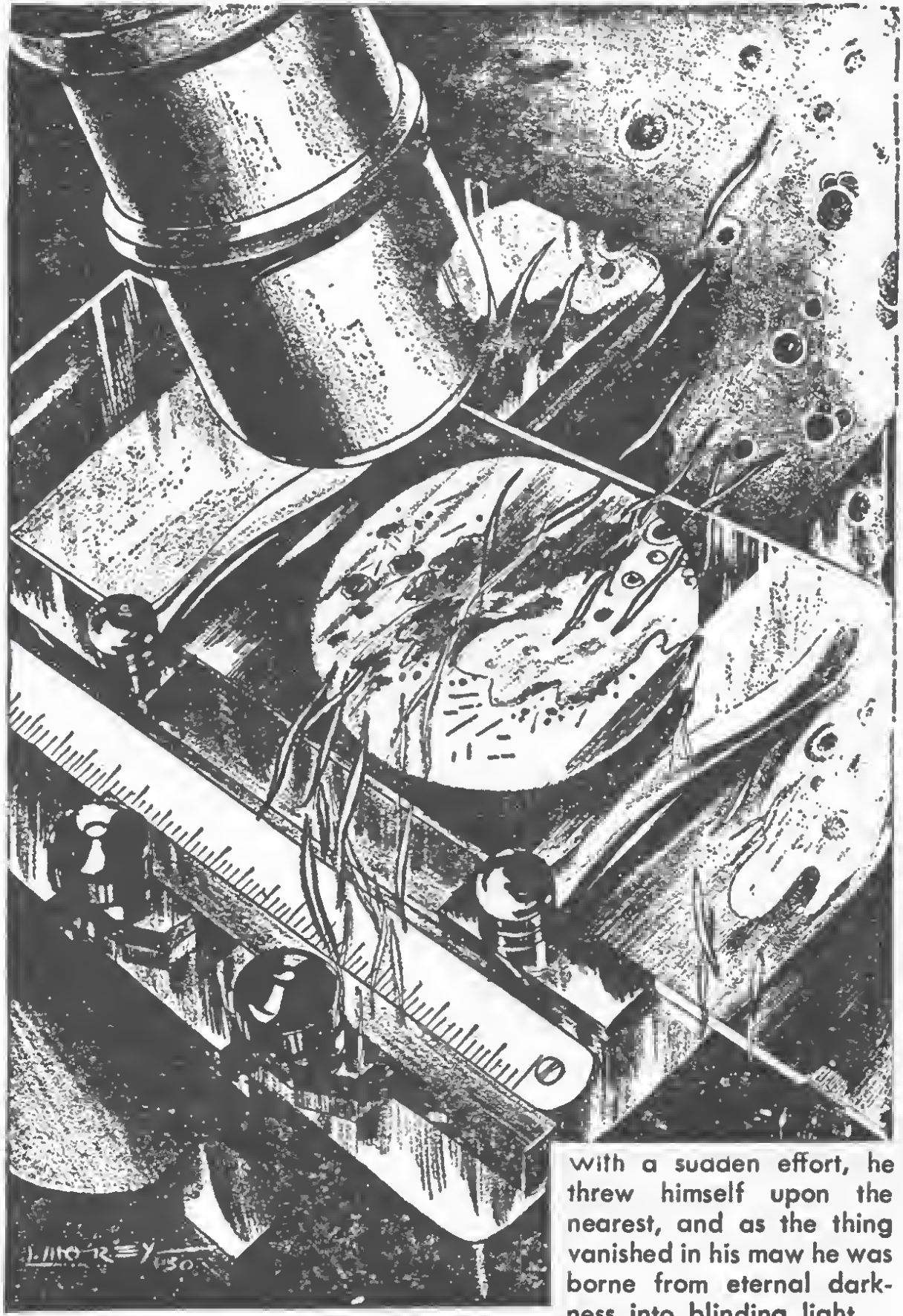
Introduction by Sam Moskowitz

THE short-short story has always been one of the most difficult forms to handle properly in the science fiction field—the major reason being that it does not permit enough wordage to build up an effective background and still carry a story. In other forms of fiction we accept everything but the story situation on faith. This is not possible in science fiction.

An internationally renowned archeologist and naturalist, A. Hyatt Verrill wrote dozens of books on his specialties. His relaxation was writing science fiction and virtually all of his stories of that nature appeared in AMAZING STORIES and AMAZING STORIES QUARTERLY. *Most of his efforts were of novelet and novel length and many oldtimers still affectionately recall* Into the Green Prism, Beyond the Green Prism *and* The Bridge of Light. *His attempt at the short-short came as a surprise to early readers of* AMAZING STORIES, *and proved one of the most popular tales of that length in the history of the magazine.*

HE WAS a magnificent specimen of his kind. Translucent—white, swift in movement, possessing an almost uncanny faculty for discovering his prey, and invariably triumphing over his natural enemies. But his most outstanding feature was his insatiable appetite. He was as merciless and as indiscriminate a killer as a weasel or a ferret; but unlike those wanton destroyers who kill for the mere lust of killing, the Exterminator never wasted his kill. Whatever he fell upon and destroyed was instantly devoured. To have watched him would have been fascinating. A rush, as he hurled himself upon his prey, a brief instant of immobility, of seeming hesitation, a slight tremor of his substance, and all was over; the unfortunate thing that had

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with a suaden effort, he threw himself upon the nearest, and as the thing vanished in his maw he was borne from eternal darkness into blinding light.

Illustrated by MOREY

been moving, unsuspicious of danger, on its accustomed way had vanished completely, and the Exterminator was hurrying off, seeking avidly for another victim. He moved continually in an evenly flowing stream of liquid in absolute darkness. Hence eyes were non-essential, and he was guided entirely by instinct or by nature rather than by faculties such as we know.

He was not alone. Others of his kind were all about and the current was crowded with countless numbers of other organisms; slowly moving roundish things of reddish hue, wiggling tadpole-like creatures, star-shaped bodies; slender, attenuated things like sticks endowed with life; globular creatures; shapeless things constantly altering their form as they moved or rather swam; minute, almost invisible beings; thread-like, serpentine or eel-like organisms and countless other forms. Among all these, threading his way in the over-crowding warm current, the Exterminator moved aimlessly, yet ever with one all-consuming purpose—to kill and devour.

By some mysterious, inexplicable means he recognized friends and could unerringly distinguish foes. The reddish multitudes he avoided. He knew they were to remain unmolested and even when, as often happened, he found himself surrounded, hemmed in, almost smothered by hordes of the harmless red things and was jostled by them, he remained unperturbed and made no attempt to injure or devour them. But the others—the writhing, thread-like creatures; the globular, avoid, angular, radiate and bar-like things; the rapidly wiggling tadpole-like organisms—were different. Among these he wrought rapid and terrible destruction. Yet even here he exhibited a strange discrimination. Some he passed by without offering to harm them, while others he attacked, slaughtered and devoured with indescribable ferocity. And on every hand others of his kind were doing the same. They were like a horde of ravenous sharks in a sea teeming with mackerel. They seemed obsessed with the one all-consuming desire to destroy, and so successful were they in this that often, for long periods, the ever moving stream in which they dwelt would be totally destitute of their prey.

Still, neither the Exterminator nor his fellows appeared to suffer for lack of sustenance. They were capable of going for long periods without food and they cruised, or rather swam slowly about, apparently as contented as when on a veritable orgy of killing. And even when the current bore no legitimate prey

within reach of the Exterminator and his companions, never did they attempt to injure or molest the ever present red forms nor the innumerable smaller organisms which they seemed to realize were friends. In fact, had it been possible to have interpreted their sensations, it would have been found that they were far more content, far more satisfied when there were no enemies to kill and devour than when the stream swarmed with their natural prey and there was a ceaseless ferocious urge to kill, kill, kill.

AT the latter times the stream in which the Exterminator dwelt became uncomfortably warm, which aroused him and his fellows to renewed activity for a space, but which brought death to many of the savage beings. And always, following these casualties, the hordes of enemies rapidly increased until the Exterminator found it almost impossible to decimate them. At times, too, the stream flowed slowly and weakly and a lethargy came over the Exterminator. Often at such times he floated rather than swam, his strength ebbed and his lust to kill almost vanished. But always there followed a change. The stream took on a peculiar bitter taste, countless numbers of Exterminator's foes died and vanished while the Exterminator himself became endowed with unwonted sudden strength and fell ravenously upon the remaining enemies. At such times, also, the number of his fellows always increased in some mysterious manner as did the red beings. They seemed to appear from nowhere until the stream was thick with them.

Time did not exist for the Exterminator. He knew nothing of distance nor of night or day. He was susceptible only to changes of temperature in the stream where he always had dwelt, and to the absence or presence of his natural foes and natural allies. Though he was perhaps aware that the current followed an erratic course, that the stream flowed through seemingly endless tunnels that twisted and turned and branched off in innumerable directions and formed a labyrinth of smaller streams, he knew nothing of their routes, or their sources or limits, but swam, or rather drifted, anywhere and everywhere quite aimlessly. No doubt, somewhere within the hundreds of tunnels, there were others of his kind as large, as powerful and as insatiable a destroyer as himself. But as he was blind, as he did not possess the sense of hearing or other senses which enabled the higher forms of life to judge of their surroundings, he was

quite unaware of such companions near him. And, as it happened, he was the only one of his kind who survived the unwanted event that eventually occurred, and by so doing was worthy of being called the Exterminator.

For an unusually long period the current in the tunnel had been most uncomfortably warm. The stream had teemed with countless numbers of his foes and these, attacking the reddish forms, had decimated them. There had been a woeful decrease in the Exterminator's fellows also, and he and the few survivors had been forced to exert themselves to the utmost to avoid being overwhelmed. Even then the hordes of wiggling, gyrating, darting, weaving enemies seemed to increase faster than they were killed and devoured. It began to look as if their army would be victorious and the Exterminator and his fellows would be vanquished, utterly destroyed, when suddenly the slowly-flowing hot stream took on a strange, pungent, acrid taste. Instantly almost, the temperature decreased, the current increased and as if exposed to a gas attack, the swarming hosts of innumerable strange forms dwindled. And almost instantly the Exterminator's fellows appeared as if from nowhere and fell ravenously upon their surviving foes. In an amazingly short time the avenging white creatures had practically exterminated their multitudinous enemies. Great numbers of the reddish organisms filled the stream and the Exterminator dashed hither and thither seeking chance survivors of his enemies. In eddies and the smaller tunnels he came upon a few. Almost instantly he dashed at them, destroyed them, swallowed them. Guided by some inexplicable power or force he swept along a tiny tunnel. Before him he was aware of a group of three tiny thread-like things, his deadliest foes—and hurled himself forward in chase. Overtaking one he was about to seize it when a terrific cataclysm occurred. The wall of the tunnel was split asunder, a great rent appeared, and with a rush like water through an opened sluice-way the enclosed stream poured upward through the opening.

Helpless in the grip of the current, the Exterminator was borne whirling, gyrating madly into the aperture. But his one obsession, in all-consuming desire to kill, overcame all terror, all other sensations. Even as the fluid hurled him onward he seized the wriggling foe so near him and swallowed it alive. At the same instant the remaining two were carried by the rushing current almost within his reach. With a sudden effort he threw

himself upon the nearest and as the thing vanished in his maw, he was borne from eternal darkness into blinding light.

Instantly the current ceased to flow. The liquid became stagnant and the countless red beings surrounding the Exterminator moved feebly, slowly, and gathered in clusters where they clung together as if for mutual support. Somewhere near at hand, the Exterminator sensed the presence of the last surviving member of the trio he had been chasing when the disaster took place. But in the stagnant, thick liquid, obstructed by the red beings, he could not move freely. He struggled, fought to reach this one remaining foe; but in vain. He felt suffocating, becoming weaker and weaker. And he was alone. Of all his comrades, he was the only one that had been carried through the rent in the tunnel that for so long had been his home.

Suddenly he felt himself lifted. Together with a few of the reddish things and a small portion of his native element, he was drawn up. Then with the others, he was dropped, and as he fell, new life coursed through him, for he realized that his hereditary enemy—that wiggling threadlike thing—was close beside him, that even yet he might fall upon and destroy it.

The next instant some heavy object fell upon him. He was imprisoned there with his arch enemy an infinitesimal distance from him, but hopelessly out of reach. A mad desire to wreak vengeance swept over him. He was losing strength rapidly. Already the red beings about him had become inert, motionless. Only he and that threadlike, tiny thing still showed signs of life. And the fluid was rapidly thickening. Suddenly, for a fraction of a second he felt free, and with a final spasmodic effort he moved, reached the enemy, and, triumphant at the last, became a motionless inert thing.

"STRANGE!" muttered a human voice as its owner peered through the microscope at the blood drop on the slide under the objective. "I could have sworn I caught a glimpse of a bacillus there a moment ago. But there's not a trace of it now."

"That new formula we injected had an almost miraculous effect," observed a second voice.

"Yes," agreed the first. "The crisis is past and the patient is out of danger. Not a single bacillus in this specimen. I would not have believed it possible."

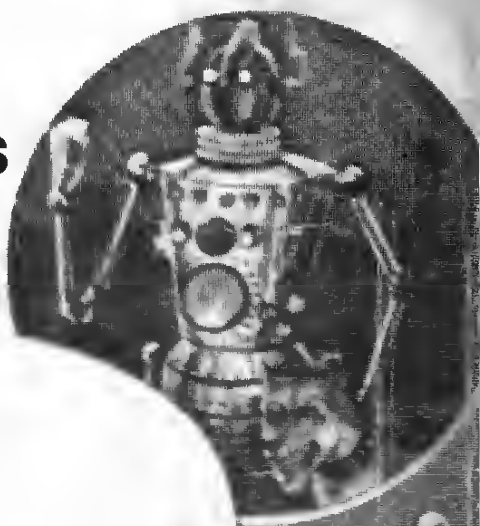
But neither physician was aware of the part the Exterminator had played. To them he was merely a white corpuscle lying dead in the rapidly drying blood drop on the glass-slide. THE END

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